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Permanent Way of Railroads.

A very interesting discussion recently took place on the above subject at a meeting of the Society of Engineers in London. It arose from the reading of two papers on the subject—one by W. Bridges Adams, C. E., and and another by P. M. Parsons, C. E. The facts elicited were of considerable importance. It was stated that one thousand miles (single line) of iron permanent way had been laid in England, and that Greaves' system (illustrated on page 89, this vol., SCIENTIFIC AMERICAN,) had been extensively and satisfactorily used in Egypt. As to the assumed rigidity of cast iron permanent way, an objection urged against this system by some persons, this had been demonstrated to be a fallacy. It was found after a number of years of hard usage to be in an excellent state of preservation, and had not produced any injurious effect upon the rolling stock—engines and cars. The general opinion of the engineers present seemed to be that cast iron sleepers were preferable to those of wood.

Curious Chemical Explosion.

On the 25th ult., while the assistant of Professor Doremus was preparing some oxygen gas, in the laboratory of the Medical College, this city, from the chlorate of potash, the receiver exploded with terrific violence, shattering the windows and otherwise doing considerable damage. At the time this accident took place, neither the Professor nor any other person could account for its cause. The gas itself is not explosive. What, then, was the cause? The flask containing the chlorate of potash, from which the gas was generated, became red hot, consequently the gas passed over in a highly heated state. In this condition, it is believed, it decomposed a portion of the receiver, which was india rubber, converting it into carburetted hydrogen gas, which being saturated with the oxygen, acquired a highly explosive character and was ignited by the hot oxygen.

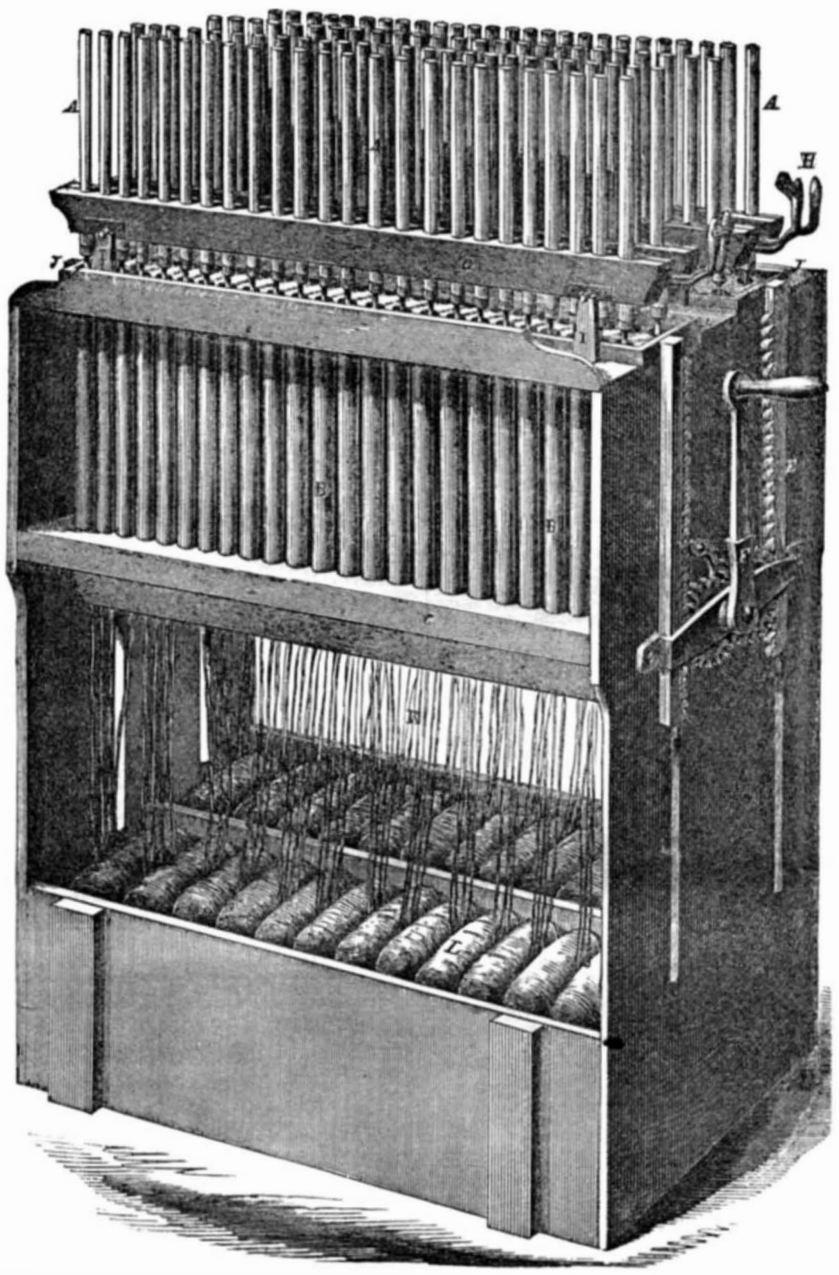
The Menai Tubular Bridge.

The Philadelphia *Ledger*, which is usually so correct in mechanical matters, gives Brunel, Jr., too much credit in attributing to him the authorship of the above named celebrated bridge. William Fairbairn, C. E., discovered the best form of bridge, and he certainly is the inventor of it, as it is now constructed. Brunel, Jr., had nothing to do whatever with its construction or erection.

Caution to Flies, Mosquitoes. Roaches &c.

We have received from Mr. I. S. Clough, inventor, 168 Broadway this city, some samples of his ingenious fly, mosquito, and roach traps. They are sure death to all unfortunate vermin which enter. We have seen practical evidence of this fact. These traps are particularly useful at this season of the year; and as they are cheap in price and ornamental in appearance, they will please everybody.

HUMISTON'S CANDLE MACHINE.



Although in large towns and under favorable circumstances for the introduction of the successive innovations, it may with propriety be said that candles have long since given way to oil, and this again to burning fluid, which latter has been, in turn, superceded by gas, there are peculiar conveniences attending the use of the ordinary tallow candle, which will probably forever create for it an extensive demand. The many processes for forming these may be included under the heads either of dipping or molding, and the superior perfection of the product induces a strong preference for the latter. There are several machines in use to facilitate the manufacture by this method of these important illuminators, one of the most important and efficient of which is represented in the accompanying engraving. The wicks are drawn, by an automatic movement, through the mold, and held in place, while the melted tallow, poured by hand, congeals around them, and the finished candles are expelled by an easy movement, and conveniently removed in dozens or hundreds at a time, by the aid of simple clamps which grasp them.

The machine is a tolerably simple construction of moderate size, as represented in the accompanying illustration. The view is taken at a moment when the candles have just been thrust up from the molds, and are in the act of being seized by the clamps for removal.

A represents the candles, which are molded base uppermost. B are the molds of tinned iron, or any suitable material slightly tapered. C is the flooring on which the molds are supported, and which is, in some of these constructions, lined with lead, and made to support ice water, which surrounds the molds, B, to hasten the cooling. D represents a movable platform capable of sliding vertically in the slots at each extremity, and attached to which are racks, E E, operated by the crank, F, which is turned by hand. Fixed in D are tubes or hollow plungers, smaller than the candles, through which the wicks, K, are led from the spools, L, below. When the candles are sufficiently cooled in the molds, revolving the crank, F, elevates, D, and consequently thrusts them out at the top as represented. The upper ends of the tubes or hollow plungers are spread and made to fit nicely to the ends of the candles, as shown at the lower extremities of A. To facilitate the pouring of the tallow into the molds after the frame, D, has been depressed by a counter revolution of the crank, F, the cast iron troughs, J, are provided at the top as represented. G represents the clamps, each of which are composed of four parts, to embrace two rows of candles, all operated by one movement of the handles, H. These clamps are supported on the standards, I, and may be readily removed by hand to deposit them in the boxes.

The operation of candle making by this machine is simply as follows:—Commencing with the parts in the position represented, the pawl is elevated, and the crank, F, revolved in such manner as to lower the racks, E, thus depressing the platform, D, and drawing downwards the hollow plunger through the molds. The wicks being still fast to the candles above, remain, of course, stationary. When D is in its lowest position, the troughs, J, are filled with tallow from the ladle, and after a few minutes cooling, the wicks connected to A, are cut by a rapid movement of a long handled knife, and the link represented being previously on the handles, H, the clamps, G, are lifted, and the candles, A, removed. Meantime the tallow in B has been rapidly cooling, and after a length of time depending on the temperature of the air, or of the water surrounding B, the superfluous tallow and wicking is scraped from the molds by an implement made to traverse in J, and the clamps, G, having been placed on the uprights, I, and opened as widely as possible to allow the easy ascent of the still somewhat soft candles, the crank, F, is moderately revolved, and the lot of candles gradually lifted, drawing with them the wicks, K, which are delivered from the spools below. The operation is very simple and rapid, and the machine cannot be too much admired, either for its labor saving qualities, or the cleanliness and perfection with which this operation is conducted.

This machine was patented April 4, 1854 For further particulars address the inventor, Mr. Willis Humiston, Troy, N. Y.

Rezoil.

Mr. S. Piesse, in the *Gardeners' Chronicle*, says: It is well known that the patience and labors of the horticulturist are frequently rendered unavailable by the appetite of some insects. For preserving their flowers from these enemies, gardeners have adopted several plans, not one of which appears to be effective, more especially against the earwig, which is most to be feared as the flowers approach maturity. How many show dahlias are thus "cut off in their bloom!" With the hope that the following recipe will offer some check to these marauders, I send to you, assured that its cheapness and easy application will render it universally appreciated. Take of common rosin, 1 1-2 lbs.: sweet oil, 1 lb.: place them in a pipkin over the fire until the rosin is melted, stir the materials together, that they may be well blended; when cold the substance formed, which I call "rezoil," will be of the consistency of molasses. To use the rezoil it should be spread with a brush upon shreds or any fitting material, and wrapt round the stem of the plant; if any support is used, that should be brushed over also. No insect can possibly, or will attempt to cross this barrier; the rezoil never dries, but always remains sticky and clammy—its action as a trap is therefore obvious. To preserve grapes and other wall fruit we have only to nail a strip of list upon the wall round the entire plant, and then paint it well with the rezoil on both sides, if it can be managed, to keep insects from crawling under as well as over. Other modes of application will suggest themselves without my here enumerating them. Birds, cats and mice equally avoid soiling themselves with this substance.

The two mammoth steamships which are talked of to form a new line for California, will probably be constructed by Messrs. Perrine, Stack & Patterson, of Williamsburg. They are to be 450 feet long, with two pairs of paddle wheels.

The *Roanoke*, another of the new screw frigates, has just made a successful trial trip, and has been sent off on a cruise. Her speed under steam alone was eight knots, burning 3600 pounds of coal per hour.

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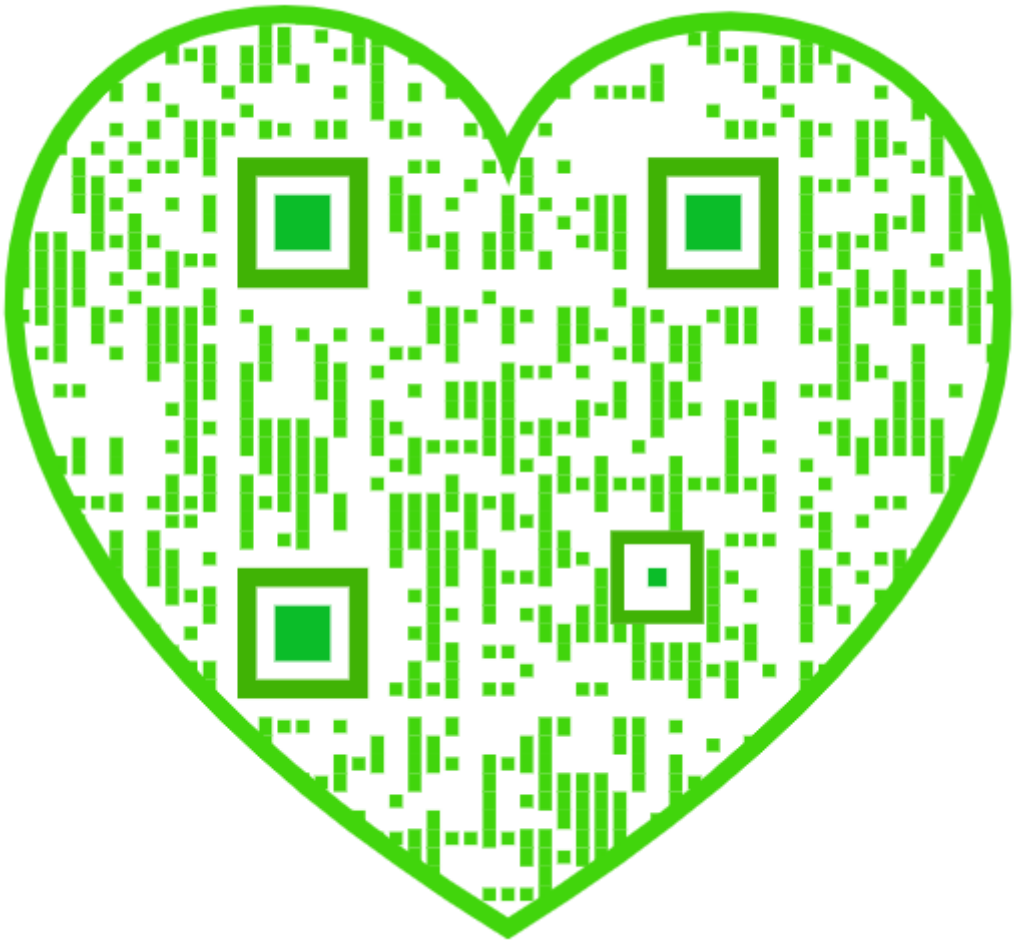

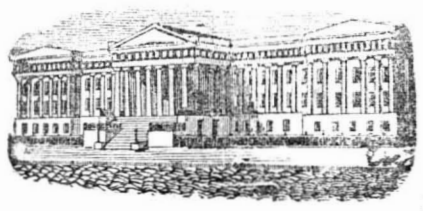

[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JUNE 2, 1857.

DOOR LOCK—Thomas B. Atterbury, of Pittsburgh, Pa. I claim, first, The use of the vibrating arm, Q Q, arranged and constructed as described, which, whilst it acts as a tumbler to the bolt, B, serves, in combination with the follower, D, as a means of disconnecting the spindle from the bolt when the door is locked, and connecting them when unlocked, as specified.

Second, I do not claim the use of a dead latch operating directly on the locking bolt, to prevent it being locked or unlocked by the key, as that device is well known.

But I claim the use of an arm or lever, F, which, when pressing upon the tumbler of the lock, prevents its being raised, thus forming a guard which protects the locking bolt from any action of the key, and prevents the locking or unlocking of the bolt, in the manner substantially as explained.

SLEEVE FASTENER—Wm. A. Bates, of Boston, Mass: I do not claim forming a sleeve fastener by means of hinged spring arms, a slot and ears, as patented by Farr & Thompson, assignees of John Mansure, my invention differing materially therefrom, and having important advantages over the same.

Nor do I claim in buttons or fastenings for clothes having one end of the eye or tongue hinged, or rigidly fastened to the button, and making the tongue or eye elastic, and forming a cavity or counter sink in the body, to facilitate the entrance of the tongue or eye into its hole in the body, such being the subject of a patent granted to Richard Oliver, Oct. 10, 1854. My invention differs from this—the body in my clasp being made so as to spring longitudinally

I claim my improved bracelet clasp, made with a slotted tongue and catch hook, and with its body to spring lengthwise, as described.

SKATES—R. W. Belson, of Philadelphia, Pa.: I do not claim separately forming the runner of two parts, for this has been previously done.

I am also aware that the stock formed of a certain number of parts, and the runner of a skate, have been cast solid or in one piece, and a patent was granted to B. F. Shelabarger for such mode of construction. In Shelabarger's skate the object appears to be economy only, no reference being had to the formation of the gutter.

Neither do I claim casting the stock and runner in one piece, for this has also been previously done.

But I claim constructing the skate entirely of cast metal, and of two parts connected together, substantially as shown and described.

[This skate is cast in two longitudinal equal parts, which are afterwards fastened together by screws, and the runner is chilled, so that it is rendered very durable, and not liable to wear. This improvement greatly reduces the cost of manufacturing skates.]

HYDRANT—Wm. W. Binney, of Seneca Falls, N. Y.: I claim the pipe, D, fitted within the case, A, and within the tube or neck, d, the pipe having a flanch or collar, i, upon it, above the neck, d, and provided with a valve, f, at its perforated lower end, said pipe being fitted within the neck or tube, d, and used in connection with the box or chest, C, and spring, h, the whole being arranged as shown, for the purpose set forth.

[This hydrant is self-closing in its character; it has few parts, and these are arranged in a very simple manner to effect the self-closing of the valve, when no more water is to be drawn; also to allow the waste water to flow down, and prevent the hydrant from freezing in cold weather; the box, the tube, and its valve, can also be easily disconnected from the top and lifted up for repairing when necessary—a very convenient and useful arrangement. The hydrant is opened by pressure on a lever; when this (the pressure) is removed, the valve closes by the pressure of a spring and the water on its bottom; the waste water in the tube then flows down through passages into a chamber below the reach of frost.]

FASTENINGS FOR GARMENTS—Jeremy W. Bliss, of Hartford, Conn.: I am aware that narrow flat hooks have been soldered on the plates used for belts and other purposes, hooking into holes or eyes prepared for them.

Also that wire pins have been secured on ornaments having blunt ends, so that by pricking holes through any article to which it is desirable they shall be attached the said pins may pass through, and be fastened thereto by bending the pins down—all such arrangements I do not claim.

I claim the new manufacture of fastening for garments described, to wit, a plain or ornamental plate or bar, having sharp hooks permantly fastened to it, pointing towards each other or towards the center, so arranged as to be conveniently hooked into the garments to be fastened or unhooked therefrom.

MOWING MACHINES—S. P. Briggs, of Saratoga Springs, N. Y.: I claim the peculiarly constructed attachment described, when connected to and used in combination with the Ketchum mowing machine, in the manner and for the purposes set forth.

PRINTING PRESSES—Jason L. Burdick, of New York City: I claim first, The arrangemeut of working the roller, A, upon which the type is attached, in such a manner as to communicate to the same a forward and backward motion, in connection with a rotating motion, substantially as described.

Second, I claim the arrangement of a guide piece, for the purpose of guiding the type roller in the latter part of its forward motion, so as to bring the types always square against the platen, T, containing the paper or card to be printed.

DOOR HINGE—S. M. Bullard, of Holliston, Mass.: I do not claim the inclined planes, for they have been long known and used.

But I claim the detached anti-friction roller inserted between two inclined planes, in the manner and for the purpose described.

PREPARING THE FIBRE OF BANANA, PLANTAIN ALOE, &c.—Francis Burke, of British West Indies. Patented in England July 14, 1855: I do not claim any of the parts of the machine separately.

But I claim the combination of the beating cylinder with the endless apron or yielding table, or surface under the apron, substantially as explained.

HANGING MILL-STONES—Wm. A. Clark, Samuel D. Porter, and Wm. D. Simpson, of St. Louis, Mo.: We claim suspending the upper stone from above by means of a ball and socket joint, or its equivalent, when the eye of the said stone is made to embrace the upper portion of the spindle of the running stone, and is secured thereto with a sufficient degree of rigidity, by means of an elastic packing, substantially in the manner and for the purpose set forth.

PACKING PISTONS AND STUFFING-BOXES OF STEAM ENGINES—Patrick Clark, of Rahway, N. J.: I claim the foil or plastic sheet metal packing, as set forth.

FEEDING GAS GENERATORS—C. B. Loveless, of Syracuse, N. Y.: I make no claim to cut-off valves broadly.

But I claim as an improvement in portable gas apparatus the connection of feeder, H, with the retort, R, by the arrangement of pipes, a and b, when combined with the cut-off valve, V, the entire arrangement operating substantially as set forth.

STEAM PUMPING APPARATUS—George H. Corliss, of Providence, R. I.: I claim the arrangement of a series of steam cylinders and pumps combined radially around a central crank shaft, with a central crank and crank shaft, with which the whole series of pumps and steam cylinders are connected, substantially in the manner and for the purpose described.

I also claim the method described of forming the connection between the pistons of a series of cylinders and a single crank pin, by means of a disk-ended connecting rod, and which is appropriated to one piston in the series, and which is fitted with a series of pins, to which the remaining connecting rods of the series of cylinders are applied, thus obviating the direct application of all the connecting rods in the series to the same crank pin.

LOCK—Julius M. Cook, of Hinsdale, Pa.: I claim the set arranged and operating in connection with the wheels, fly and shaft, as described.

WATER WHEEL—Reuben Daniels, of Woodstock, Vt: I am aware that it is common in all wheels to bind or hold the ends of the buckets by means of narrow rims which cover the ends of the buckets, and therefore I do not claim such rims.

I also disclaim, broadly, confining the stream of water to its effective course. An example of this is seen in E. Parker's patent, dated July 24, 1847.

I also disclaim, broadly, the admitting of water within the wheel, and discharging from its periphery, as such wheels are in general use.

I also disclaim any special form of the buckets

I also disclaim every feature of the described invention which is seen in any other water wheel of this class.

But to the best of my belief no wheel has ever been made of the class now shown in which a flanch, c, was employed in the manner and for the purpose described. The use of such a flanch causes the wheel to present new virtues of a great and important character.

I claim the use of a flanch, c, or its equivalent, in the manner and for the purposes substantially as described.

[This wheel receives its water at the center and discharges it at the periphery. It has an extended flanch, to which the top of the buckets are secured, and which flanch forms a cover to the mouth of the flume. The water is discharged at the sides, and air is admitted at the top of the cover. The water escapes from it freely, not being dragged around by the wheel, or offering resistance to its movements, as in most other wheels.]

SEWING MACHINES—James E. A. Gibbs, of Millpoint, Va.: I claim the revolving hook described, constructed and arranged in relation to, and operating in connection with, the needle, as set forth.

I also claim, when sewing with a single thread, interlacing or twisting the threads of the loop after passing the cloth to be sewed, and before taking a fresh loop, substantially in the manner and for the purpose specified.

POTATO DIGGERS—Isaac Griffen, of Quaker Springs, N. Y.: I claim the arrangement of the drag, G, axle, A, and swinging fork, F, substantially in the manner and for the purpose set forth.

PLOWS—John S. Hall, of West Manchester, Pa.: I claim vibrating the beam in a circular bearing in the land side, together with the oblique adjusting and securing slots, i i, the whole combined and arranged substantially as described, whereby the draft end of the beam may be vertically adjusted, and the beam so secured to the land side as that it is impossible for the former to slip.

BLOCK FOR BLACKING BOOTS AND SHOES—Francis G. Harding, of Boston, Mass.: I do not claim two shells in connection with a spring and screw, irrespective of peculiarity of construction, and merely viewed as a stretching block or tree, for such devices are now used for such purposes.

I claim the described new article of manufacture, consisting of the thin metallic shells, A and B, hinged at a, the former having an extension, b, to serve as a handle to the implement, and fitting the front inside of the shoe, and the latter fitting the inside of the heel, the said shells being distended, and the shoe thereby firmly held by means of the screw, C, passing through the shells, B, and abutting against the projection, c, of the shell, A, in the manner and for the purpose specified.

[This block for stretching the leather of shoes is made in two halves—a front and a back shell section of the foot—which are united at the top by a screw, capable of distending the block and stretching the leather smoothly and accurately to the proper shape—a very convenient improvement.]

GAGE FOR HAND SAWS—Michael Kennedy, of Troy, N. Y.: I claim making the gage for regulating the depth of the saw cut with adjustable clamps, C C, which are formed to fit and gripe the saw back, and are attached to the arms of the gage independently of the set screws, by which the clamps are fastened to the saw back, as described, so that the gage can not only be fastened at any desired place upon the blade without requiring the blade or the saw back to be perforated, but so that the gage can also be removed from and replaced upon the saw without altering the set of the gage, and so that the gage can be adjusted upon the blade, without loosening the clamps which hold the gage to the saw.

FAUCET—Lucius J. Knowles, of Warren, Mass.: I claim combining with, or arranging with respect to the valve stem and eduction passage of the body of the faucet, as described, the secondary chamber or drip passage, D, the same being for the purpose or to operate as specified.

I also claim arranging an annular groove, g, in that part of the valve stem which slides in and out of the recess, d, of the body of the faucet, the same being for the purpose as specified.

LIFE PRESERVERS—James Knight, of New York City: I claim the construction of the supporter, to sustain the head in the position assumed by persons when swimming, thus relieving the wearer from muscular effort, and attached to this supporter a shield to protect the mouth and nostrils from the violence of the waves, and this supporter and shield fitted to the ordinary life preservers as worn around the body, by having attached to them sheaths, as represented, one of them fitted with a sheath, to admit the stem of the supporter for adjustment to the wearer. The whole when combined constitutes my improvement.

LOCOMOTIVE BOILERS—J. E. McConnell, of Wolverton, Eng. Ante-dated Dec. 2, 1856: I do not confine or restrict myself to the precise details or arrangements which I have had occasion to describe or refer to, as many variations may be made therefrom without deviating from the principles or main features of my invention

What I consider to be novel and original, and therefore claim, is the fire-box increased in size, so as to extend into the barrel of the boiler, and in connection therewith the tubular stays conveying a supply of fresh air into the extension described, whereby the products of combustion are consumed in a more perfect manner, substantially as set forth.

I also claim the water tubes, E, arranged in relation to the fire-box and the surrounding boiler, in the manner and for the purpose specified.

SCROLL SAWING MACHINE—John J. Curtis, of East Boston, Mass.: I claim, first, The rotating bed or table, C, arranged substantially as shown, and in such a relation to the saw that the bed or table may rotate around the cutting edge of the saw as a center, for the purpose set forth.

Second, I claim the feeding wheel, Q, arranged and operated substantially as shown, when used in connection with a rotating bed or table, C, for the purpose specified.

[This improvement embraces a rotating bed and a feeding wheel, the latter being operated automatically, and feeding the stuff properly to the saw, in whatever position the work may be placed, as conducted by the operator. This feed motion is always regular in proportion to the stroke of the saw, and is a very ingenious improvement.]

MANUFACTURING SCREWS—John L. Mason, of New York City: I claim the mode described of forming screw threads on cups, hollow cylinders, or hollow cones, of thin soft metal, substantially as described.

SOWING SEED BROADCAST—Daniel Haldeman, of Morgantown, Va.: I am aware that vibrating scatterers with upward projecting pins have been used, in connection with the bottom of the hopper, but incapable of vertical movement.

I am also aware of the notched bars for graduating the seed discharge.

I do not claim these devices of themselves.

But I claim the vertically adjustable graduating bar, G, with recesses, as described, in combination with the vibrating scatterer and agitator connected therewith, when said parts operate together, as set forth.

HARVESTING HEMP—John B. McCormick, of Versailles, Ky.: I claim the combination of the adjustable bar, I, and seat, J, with the bars, K K, rods, Q Q, movable bar, L, and narrow platform, G, when said parts are arranged in relation to each other, to facilitate the harvesting of hemp, as described.

[In this hemp harvester there is an adjustable seat for the driver, also an adjustable reel. The seat is set to give the driver the most suitable position, and the reel its proper line of action, according to the hight of the hemp. There is also a movable platform, for enabling the driver to discharge the cut hemp on the ground in gavels—no raking attachment being employed.]

ATMOSPHERIC CHURNS—Robert McCutcheon, of Towanda, Pa.: I do not claim using atmospheric air in a churn to produce butter, by the mechanical disturbance of the cohesion of the oily and serous part of milk or cream by agitation, as that is known and used

But I claim the bellows, F F', the chambers, C and D, and the air pipe, M, when arranged in relation to each other and to the body of the churn, in the manner and for the purposes set forth.

SOWING SEED BROADCAST—A. C. Miller, of Morgantown, Va.: I claim, in combination with the adjustable bottom, K, and its openings, G, and the stirrers, D B, the secondary hinged bottom composed of the two pieces, H H, with their openings, m, the whole being combined in manner and for the purpose set forth.

PARING HORSES' HOOFS—V. N. Mitchell, of Concord, N. C.: I do not claim the machine described, nor any of the portions thereof, in themselves.

Nor do I limit myself to the use of the precise mechanism described, as other forms thereof may be more advantageous for the working of my improvement.

I claim the reciprocating frame, C, provided with the knife, D, and plate, E, the frame being attached to the upright, B, having a recess, c, in its upper end, the whole being arranged specifically as shown and described, for the purpose set forth.

[This is a useful and much required improvement for blacksmiths. The paring knife is fitted into a reciprocating frame; it works in guides, and its cuts are regulated by adjustable plates. The horse's hoof to be pared is placed in a recess, and the blacksmith operates the knife by a lever, paring the hoof rapidly, smoothly, accurately, and with ease.]

CAST IRON CAR WHEELS—Albert L. Moury, of Cincinnati, O.: I claim providing the hub, a, with a concave or other formed channel around the center of the circumference, and arranging in the said channel, the bead, f f and ribs, g g, and therewith the hub thus constructed, uniting it with the wheels, as specified, when the parts of the wheels are made and proportioned, all as and for the purposes mentioned.

FLUID METER—James R. Maxwell, of Cincinnati, O.: I claim the arrangement of the piston, with the parts employed, for moving the valve, g, all arranged as represented, and for the purposes mentioned.

CHURNS—Henry C. Nicholson, of Mount Washington, O.: I am aware flutter wheels have been used in churns, but in such manner as to prevent the free agitation of the cream, viz., by causing them to rotate against a division board, or by passing a hoop around their peripheries, either of which do not effect the object I have in view. I do not claim either of these plans.

But I claim the so arranging of the flutter wheels upon bent arms as that the cream agitated by them shall not re-act against any dividing surface, or be impeded by any surrounding piece, and thus I allow the agitation to be more direct in a vertical line, and not follow the rotation of the shaft on which they are placed, as set forth and represented.

LEATHER SHOE BINDING—Eugene L. Morton, of Charlestown, Mass.: I claim the improved process described of manufacturing shoe binding, by dividing the skin or sheet of leather into strips of equal width, joining them at their ends, so as to connect them into one long strip, and coloring the same when so formed, the whole being formed of or reduced to an uniform thickness, and the fleshy or surplus portions of the leather removed by splitting, or otherwise.

FEEDING GRAIN TO MILL-STONES—Milton and Chas. Painter, of Owing's Mills, Md.: We disclaim every part and feature of our device which is seen in any other grain feeding apparatus.

But to the best of our knowledge and belief it is new to regulate the feed of the grain by the swaying of a cup. L, which is located and combined with, and at the mouth of a swinging tube, as described.

We claim in grain feeders, regulating the feed of the grain by the swaying of the cup, L, in the manner substantially as described.

[The grain is fed into the stone in such a manner that the eye of the stone is never clogged, and the feed is uniform. A gyrating tube is inserted into the eye of the runner, and it has a cup located near its upper part, or mouth. The cup is filled from the spout of a hopper, and it gyrates with the tube, the grain overflowing and falling over its sides into the feed tube, and down into the stones. The quantity of grain fed into the stones is uniform with their velocity, and the position of the hopper in the cup. The feed is altered by raising or lowering the spout of the hopper in the cup. These are very simple and practical devices for feeding grain to mill-stones.]

HYDRAULIC BLAST GENERATOR—August F. W. Partz, of New York City: I do not claim a wheel or cylinder composed of coiled or turbinated compartments, which communicate with a hollow shaft.

Nor do I claim a vessel containing the fluid wherein said wheel is partially immersed.

I claim, first, The arrangement of the several parts of my machine.

Second, A chamber attached to and communicating near its bottom with the vessel enclosing the wheel, into which chamber the hollow shaft of said wheel opens and discharges, and which contains one outlet for the air accumulating in its upper part, substantially in the manner and for the purpose described.

CONDENSING VAPORS AND GASES FOR EVAPORATING LIQUIDS—A. F. W. Partz, of New York City: I claim in apparatus for facilitating the absorption of vapors and gases, &c., and the evaporation of liquids, the combination of the revolving perforated disks or sheets, with the vessel containing the liquid of absorption or evaporation into which they dip, and the hood or cover which guide the vapor and gases that are introduced through the unimmersed portions of said disks, substantially in the manner and for the purpose described.

OSCILLATING PRINTING PRESSES—Chas. Potter, Jr., of Westerly, R. I.: I do not claim lifting the feet board for the purpose of carrying the sheet to the grippers, independent of its application or adaptation as described.

Neither do I claim actuating the "fly" by a cam and spring, as that is common.

But I claim, first, The manner of adjusting the impression by means of the levers, h, and screws i, substantially as described.

Second, I claim the use and adaptation of the lifting feed board, l, for carrying the sheet to the grippers, when combined with the oscillating eccentric segment, D.

Third, I also claim operating the "fly" by the cam, S, when so constructed as to cause said "fly" to conform to the motions of the bed B, and oscillating eccentric segment, D, as fully set forth.

MACHINE FOR MAKING SHOVELS—D. B. Rogers, of Pittsburgh, Pa.: I claim the use of the rollers, O P Q, in connection with the dies K and R, and the pitman, J J, arranged and operating in the manner specified.

SEED PLANTERS—S. G. Randall, of Dixon, Ill.: I claim hinging the seed hopper with its drive wheel, G, and other appliances connected with it to the side pieces of the harrow by the pivoted arms, D, so that when said hopper is thrown forward, it shall rest on and be operated by said drive wheel, which runs on the ground for that purpose, and when thrown back, rest on said pieces, and be out of action as set forth.

HARVESTERS—Wm. T. B. Read, of Alton, Ill.: I claim making the shoe, E, in one piece, as described, so that by its peculiar formation, it shall serve not only as a support for the fingers' bar, A, and as a support and guide for the inner end both of the sickle bar, C, and connecting rod, D, but also as a means of preserving the connection between the connecting rod and sickle bar, as set forth.

[This improvement relates to the sickle of harvesters which are operated by a crank motion. It provides for the strain which comes upon the sickle bar, tending to bend it, when the crank is at its upper and lower points of rotation. The sickle bar is so guided by the devices described, that it is not subject to oblique strains, therefore the sickle cuts with greater ease, much friction being obviated, and at the same time the bar is prevented from being twisted.]

DIE STOCK—J. F. Schaver, of New York City: I am aware that circular plates having dies or recesses of graduated different sizes cut on the peripheries have been used before, and I do not claim the same.

But I claim the arrangement of the die plate, B, when held steadfast in connection with the die plate, D, having a slight adjusting motion, constructed and operated as specified.

PORTABLE CROSS-CUT SAWING MACHINE—Stephen Scotton, of Wayne county, Ind.: I do not claim attaching a saw or saw frame to the piston of a steam engine, or the use of a simple dog, to attach the machine to a tree or log, for they are both embodied in a patent granted to S. R. Wilmot. Aug., 1855.

But I claim, first, The peculiar arrangement for feeding the saw to its work, and for changing the saw from a perpendicular to a horizontal position, substantially in the manner and for the purposes set forth.

Second, I claim a slotted saw, K and screw bolt, h, for the purposes indicated.

Third, I claim block, R, in combination with dog, Q, for purposes set forth.

CUTTING OUT HEELS OF BOOTS AND SHOES—John Shaw, of Natick, Mass.: I claim in the described cutter the cutting wings, a a, extended from it, substantially in the manner so as to remove the waste portion from the strip of leather, while the heel piece is being formed therefrom in manner as specified.

COOKING RANGES—Chas. J. Shepard, of Brooklyn, N. Y.: I do not claim a metallic conductor between the fire and oven, as the same has been used in the form of a separate block, on which the fire brick rested, but I am not aware that the side plate of the oven has ever before been formed with the thickened part at the point of curvature in said plate as specified, whereby the direct heat of the fire (which would cause burning) is intercepted, and the whole plate is heated by the conducted heat, which would not be the case if the plate and conductor (2) were in separate pieces, and by this means the oven is enlarged and rendered more efficient.

I claim forming the plate, m, that encloses the whole side of the oven next the fire, with the conductor and radiator 2, substantially as and for the purposes specified, whereby the said radiator 2, in contact with the fire, conducts the heat to and disperses the same throughout the side oven plate, m, heating the oven more uniformly and preventing burning, at the same time that the oven is enlarged as specified.

PRINTERS' COMPOSING STICKS—Jas. and Wm. Tidge well, of Middletown, Conn.: We do not claim making a composing stick adjustable to different widths.

Nor do we claim making it with a solid foot or bottom stile without apertures for the insertion of the fastening screw.

But we claim the application to the slide of a composing stick of the flange, C, and the screw E, in combination with the washer, F, interposed between the point of the screw, and the exterior surface of the foot or bottom stile of the stick, as described, and for the purposes set forth.

FILING SAWS FOR COTTON GINS—J. T. Turner, of Bridgewater, Mass.: I claim giving the files a reciprocating rotary or roliing motion, by devices such as are described or their equivalents, for the purposes set forth.

I claim the adjustable vibrating frame carrying the traverse rods, which operate the files when arranged to vibrate parallel with the plane of the saws, so as to adjust and adapt the files to the saws as described.

I claim giving the saws a continuous rotary motion while they are operated upon by the files by means of a belt applied directly upon the saw cylinder.

I claim a yielding or spring file holder, in combination with a traversing rod, having a reciprocating rolling motion.

UNITING THE PANELS OF PORTABLE FENCES—Chas. Van De Mank, of Oaks Corners, N. Y.: I claim the end locking piece or board h, combined with the locking board, d, and rails e, f, and g, the whole constructed and operating substantially as and for the purposes specified.

FOLDING BEDSTEADS—J. B. Wickersham, of New York City: I do not claim a fold-up bedstead, neither do I claim securing the side rails by the invention of a pin through two holes.

But I claim securing the side rails in place when the bedstead is in an unfolded position, by the combined operation of the shoulder, a, and pin 5, inserted above the rail, substantially as and for the purposes specified.

HAT STANDS—John B. Wickersham, of New York City: I do not claim wrought iron tie rods, connecting plates and castings of iron; neither do I claim furniture formed in the shape of horizontal terraces connected by vertical columns or supports.

But I claim the manner specified of attaching the hooks of hat stands on vertical studs or rods, so that said hooks can be turned around horizontally, substantially as and for the purposes specified.

PLOW CLEVIS—J. D. Willoughby, of Pleasant Hall, Penn.: I claim the stem, B, and button, C, with the grooves, E', in combination with cylinder, B', and its elevation, i, the whole being arranged and operated in the manner and for the purpose substantially as described

PRINTING PRESSES—D. H. Windner, of Cincinnati, O.: I claim the construction and arrangement substantially as set forth of the roller bearing (n, o, r, s) pivoted to the flattened branch or arm, m, from the driving shaft and provided with the sliding spring button, t, in combination with the hook, v, or equivalent devices for the tripping and inversion of the inking roller between the consecutive inkings as explained.

DOOR BOLT—Amos Wescott, of Syracuse, N. Y.: I do not claim any particular method of moving door bolts,

But I claim the supporting and guiding of the rear or inner end of the bolt, H, by connecting it with the knob, shaft C, substantially in the manner and for the purpose set forth.

WOOD GAS GENERATORS—C. F. Werner, of New York City: I claim the arrangement of a movable boiler or retort, B, and cylinder, C, being combined in the manner and for the purpose as described.

CORN HUSKER—I. N. Whitaker, of Pecatonica, Ill: I claim the cutters, C C, and flanches or lips, e e, attached to the levers, A A, and constructed and arranged substantially as shown and described for the purpose set forth.

[This is an improvement on hand husking machines; the butts of the ears of corn are removed with cutters attached to levers. There is a bevelled lip attached to each lever above its cutter, so that when they are closed in cutting, they also force the husks from the ears.]

DRESSING WATER FURROWS IN LAND—Jesse Whitehead, of Manchester, Va.: I claim, in combination with the coulter E, and mold boards G, which scrape o and smooth the sides of the furrow, and serve to guide and direct the machine along said furrow, the horizontal plate F, which shaves off the top of the furrow, and receives all the excess of earth, and the distributors, H, for scattering the earth therefrom, so as not to leave it in ridges, the whole being combined and operating together

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substantially in the manner and for the purpose set forth.

PICKERS FOR LOOMS—T. J. Mayall, of Roxbury, Mass.: assignor to himself and Geo. N. Davis, of Boston, Mass.: I claim a picker made of hard vulcanized rubber, without seams, in the manner set forth.

FOMINY MACHINES—O. F. Mayhew (assignor to W. H. Weeks and O. F. Mayhew) of Indianapolis, Ind.: I claim the combination and arrangement of the concave A, wings or divisions, c c c c, and the adjustable openings D D D D, when constructed and operated substantially as set forth.

HOLDERS FOR SAD IRON, &c.—Leon Londinsky, of New York City: I claim a detachable handle or holder, made in sections of wood, to be placed upon the handle of a smoothing iron for tailors hatters, and laundry use, constructed and arranged substantially as and for the purposes set forth.

SPLITTING LEATHER AND HIDES—Isaie Lippmann, of Paris, France, assignor to Michel J. A. Guiet of New York City: I claim the method described for splitting skins, and by first submitting them to a fulling or beating action as described, and then when so prepared, passing them through an apparatus or machine, the cutting apparatus of which has a rapid vibrating motion against which the skin is projected slowly, substantially as specified, by which method of fulling and cutting combined, I am enabled more perfectly to split skins than has heretofore been done.

WATER GAGES FOR STEAM BOILERS—D. E. Rugg: (assignor to D. N. Force and D. E. Rugg,) of New York City: I do not claim a metallic pipe connecting with the steam and water spaces of the boiler in itself.

Neither do I claim a transparent water gage in itself.

But I claim the combination of the metallic pipe, connected to the steam and water spaces with the surrounding transparent tube or cylinder to indicate by the ebulition of the fluid in said cylinder the water level of the boiler, substantially as and for the purposes specified.

TO PREVENT COUNTERFEITING BANK NOTES, &c.: C. D. Seropyan, of New York City, assignor to Wm. Cousland, of New York City and J. D. Bald, of Philadelphia: I claim the application of at least two colors to the manufacture of bank notes, drafts, and all other papers representing value, both of which will equally or nearly so absorb the chemical rays of light, or neither of which will transmit or reflect such rays, and leaves the color or the tint of the paper less fugitive than the color of the other parts.

DOOR BOLTS—S. R. Wilmot, (assignor to S. B. Guernsey,) of Watertown, Conn.: I claim the method described of forming a raised bar from a flat plate, without straining the material injuriously, by corrugating the plate at the ends of the bar, and slitting the sides of the bar from the plates, substantially as set forth.

DIES FOR PUNCHING FORK TINES—L. S. White, of Hartford, Conn., assignor to S. S Rogers, E. W. Spering, J. H. Ashmead and E. Hurlbut, of same place: I claim supporting the small bars or slender part of the tempered die, b, by suitable supports or dies of metal, a, constructed and used, substantially in the manner described.

PLOWS—John Ormiston, of Center Township, O., assignor to D. N. Allard, Rokeby, O.: I claim uniting and adjusting the shank of the point D, to and with the shank of the coulter, E, by means of the head on said piece D, the rack on the shank of said coulters, and the stirrup and set screw, substantially in the manner and for the purpose set forth.

RE-ISSUES.

GRASS HARVESTERS—Wm. F. Ketchum, of Buffalo, N. Y: Patented Feb. 10, 1852—Re-issued Feb. 28, 1854: I claim, first, extending the shoe, H G, from the heel of the rack or finger bar upward and forward, and firmly connecting its continuation with the draught when the finger bar is located as set forth, so that the power by which the machine is drawn shall through the shoe be communicated to and draw forward the heel of the rack or finger bar; thus relieving the great strain which would otherwise come upon the lateral connections of the rack or finger bar with the wheel frame while the heel is enabled to slide over obstructions substantially as shown.

Second, When the main wheel and inner end of the finger bar or rack, D, are located relatively as described, I claim continuing the shoe, H C, from the heel of the rack or finger bar upward and forward until the upper end of its extension reaches a part of the machine which always runs above the mown grass, and which will keep the said grass down and prevent it rising over the point of the extended shoe, thus aiding the shoe to ride over the mown grass even when accumulated before it, substantially as shown,

Third, I claim supporting the heel of the rack or finger bar sufficiently near the ground, and at a convenient distance laterally from the main wheel by arms extending upwards and forwards and upwards and backwards therefrom, and connected with the frame or spring bars firmly bolted across the frame in front and rear of the said rack or finger bar, while the said frame and bars are elevated to pass over the cut grass, and the above parts are arranged as substantially shown.

Fourth, Supporting the rack or finger bar at the side of and lower than the main frame, by means of auxiliary framing in a fixed position at the side thereof, and extending downwards and forwards, so that while the finger bar is held as near the ground as desired, and lower than the main frame may be nearly horizontal in the line of draught and at any convenient hight, to avoid clogging, or accommodate the diameter of the main wheel as shown, such an auxiliary frame, as a whole is shown in the drawings, composed of bar C, rods E E I, and rack or finger bar D, but its details, may, of course, be varied, while the principle of my invention is retained.

Fifth, Supporting the rack of finger bar, D, in its position at the side of and lower than the main frame, by extending a strong bar, C, behind said rack or finger bar firmly supported by said frame, and rigidly connecting said rack or finger bar to said bar C, by a straight brace or braces, E E, said frame being elevated, and said bar being elevated and placed sufficiently in rear of said rack and finger bar to avoid clogging or lodging of the mown or falling grass against, when said parts are arranged in relation to each other, substantially as shown.

Sixth, Supporting the outer end of the rack or finger bar by a rod extending downwards and forwards from the cross bar, C, to the finger bar, parallel or nearly so to the face of the main wheel, when the frame and bar C are elevated above the rack or finger bar in the manner and for the purposes contemplated in the last claim, to avoid the falling or clogging of the cut grass against such rod, as set forth.

GAS BURNERS—C. H. Johnson, of Boston, Mass. Patented June 26, 1855—Additional improvement, dated March 18, 1856: I claim combining the gas distributor, B, or the same and the purifier C, as described, with the burner, so as to operate therewith, substantially as set forth.

I also claim elevating the top of the orifice, a, for injecting the gas into the chamber of the burner above the base of said chamber, by a cone or its equivalent, and so as to form a channel round said orifice for holding tarry matter, as well as for removing it from the orifice.

And I also claim extending the orifice, a, into the distributor, and among its wires, so as to attain advantages explained.

DESIGNS.

COOKING STOVES—Thos. H. Wood, F. S. Hubbell, and J. E. Roberts, of Utica, N. Y.

COOKING STOVES—J. D. Marshbank, of Lancaster, Pa.

Glue in Bones.

Bone contains from 30 to 36 per cent of earthy matter, chiefly phosphate of lime, and the remainder is gelatine. When bones are digested in muriatic acid, they become transparent and flexible like leather, the earthy matter is dissolved, and after the acid is all carefully washed away, pieces of glue of the same shape as the bones remain, which are soluble in hot water, and adapted to all the purposes of ordinary glue.

Expansion of Cast Iron in Solidifying.

MESSRS. EDITORS—Allow a subscriber and constant reader to correct an erroneous statement made in the last number of your valuable scientific journal (page 301) in regard to the expansion and contraction of cast iron. Your two correspondents, Messrs. Beckwith, of Michigan, and Seward, of Indiana, have (as "practical" men very often do) made a mistake. It is unalterably true, as stated in your paper of May 16, (page 285,) that "cast iron *expands in becoming solid*, and therefore takes the impression of the mold with exactness," provided the mold be perfectly unyielding. It is further true that "cast iron *shrinks* about one-eighth of an inch to the foot" *after* it has become solid, and hence the patterns must always be made in that proportion larger than the desired size. But it is not true, as added by Mr. Seward, that this shrinkage occurs to the metal "in becoming solid."

The fact is, that general as the law is that "heat *expands* bodies," the law is just as general that immediately after the melting point is reached a further heat will *contract* all bodies. At least, I am aware of no exception to the statement that liquids in being cooled down invariably expand for some time before being congealed, after which they again contract. Hence it is familiar to every founder that melted iron is *heavier* (that is, *denser*,) than solid iron, and that a pig of iron thrown into the freshly filled ladle will float on the top of the incandescent liquid, instead of going to the bottom, as it should if the melted metal were the more expanded. The same is true of lead, copper, silver, gold, &c.; and the same is true of ice, which, as known to every one, is more expanded than the water many degrees warmer, in which it floats. Water, like iron, "expands in becoming solid," and bulky anvils have been split by a few drops freezing within a small cavity, in attestation of this law of nature. D.

[Dr. Lardner in his "Treatise on Heat" says:—"Most of the metals undergo a *sudden* contraction in passing from the liquid to the solid state, but to this there are three exceptions namely, cast iron, bismuth, and antimony. A metal which contracts in passing from the liquid to the solid state cannot be made to take the shape of a mold, owing to its sudden contraction causing it in the solid form to be of less magnitude than the mold which it filled while liquid. It is for this reason that money composed of silver, gold, or copper cannot be cast, but must be stamped. Cast iron on the contrary, as it dilates, takes the impression of a mold with great exactness."

Dr. Lardner evidently teaches the doctrine that cast iron, antimony, and bismuth expand and stay expanded in cooling from a liquid state. His opinions on this point are somewhat different from those of our correspondent, whose ideas are clearly as follows:—Molten iron when poured into molds expands as its temperature decreases, until it congeals—becomes a solid—when it contracts; every one knows how much. Evidently, there is no difference between his views and those of Messrs. Beckwith and Seward, whom he intends to correct on the main point of the question. Their understanding of it is simply that castings of iron are of less magnitude than the iron in a molten state. They evidently did not intend to convey any other idea.

If, according to our correspondent, molten iron expands in cooling, then it should burst molds to pieces. He instances the prodigious power of water, in becoming ice and splitting anvils; surely, if the molten metal expands *in cooling*, he should be able to instance cases of the explosion of molds by the expansion of the metal, however small that expansion may be. On the other hand, if iron contracts in the mold, how are we to account for the exactitude of iron castings? His views on the contraction of the metal after it is congealed—all parts then shrinking equally—will account for this. If the metal shrunk in the mold before it was congealed, it certainly would not take an exact impression.

It is our opinion that the cause of the floating of solid metal upon the top of molten metal is not that the latter is of greater specific gravity, according to our correspondent's views, but a repulsive action between the two. This can be demonstrated by dropping a piece of lead into molten tin; the lead, which is of far greater specific gravity, will actually float upon the tin.

It is necessary to make patterns in some degree larger than the intended iron castings, to allow for their contraction in cooling, which equals from about the ninty-fifth to the ninety-eighth part of their length, or nearly one per cent. This allowance is very easily and correctly managed by the employment of a contraction rule which is made like a surveyor's rod, but one-eighth of an inch longer in every foot than ordinary standard measures. When a wood pattern is made, from which an iron one is to be cast—the latter being intended as a permanent foundry pattern, as there are two shrinkages to allow for—a double contraction rule is employed, or one the length of which is one-quarter of an inch in excess in every foot.

Compasses on Iron Ships.

The Liverpool (Eng.) Compass Committee, formed by the late Dr. Scoresby and others, for the purpose of inquiring into the cause of, and, if possible, providing a remedy for, the extraordinary variations of the compass on board iron ships, has been disbanded. The Liverpool *Courier* says:—

"Its decease could not have occurred at a more inopportune time than the present, when naval disasters through 'errors of the compass' are so rife. We need only instance the cases of the new iron clipper ships City of Madras and Charlemagne, lost within the past few days in the Clyde, and worth, with their cargoes, upwards of £200,000; of the iron screw steamer Arcadia, reported ashore in the Gulf of Smyrna; of the iron screw steamer Amelia, ashore near Milford; of the late total wreck of the iron screw steamer St. Andrew, on the coast of Syria; and of the complete loss, last week, on the Blackwater Bank, off the Irish coast, of the wooden clipper ship Emperor, a few hours after leaving this port for the Brazils. Surely these instances ought to suffice to show the imperative necessity that still exists for discovering a remedy for these destructive 'errors of the compass.'"

This is a subject of great importance, both as it relates to science and commerce. If the compass is unreliable on iron ships, on account of the local attraction of the magnet, then such vessels never can be unswervingly trusted, at least with such a guide as a magnet to direct them in their course over oceans and seas.

Notes on Science and Foreign Inventions.

Steel Tubes.—Messrs. J. J. Russel and J. B. Howell, England, have secured a patent for making tubes from sheets or strips of cast steel, previously rolled to the thickness desired. To make lap-jointed tubes they take a strip of cast steel of the required dimensions, and scarf the edges to form the joint; then they bend it into the shape of a tube, with the edges overlapping each other, as in making lap-welded iron tubes. The skelp thus prepared is put into a furnace, and heated to a welding temperature, then taken out, and passed between rollers over a mandrel, so as to weld the lap edges together, thus forming a cast steel tube, which is afterwards finished by being drawn through dies, to reduce it to the proper size. It is not easy to see in what respect this differs from that employed in making iron tubes.

Waterproofing Paper, Cloth and Leather.—P. Pierre Hoffman, of Strasbourg, has taken out a patent in England for a new varnish, which, when applied to the articles named in the above caption, render them, it is stated, air and water-proof, while at the same time they keep dry under all variations of temperature in the open air, are elastic, and do not become sticky—the latter being a fault common to a number of varnishes. The articles are coated with a mixture either of siccative linseed oil and sulphur, called balm of sulphur, or of a mixture of sulphur with a quantity of siccative oil, gum copal, gum opal, yellow amber, resin, india rubber, and gutta percha and with the essences of turpentine or naphtha, &c., these two latter keeping in solution the above named substances, which may be mixed separately or at the same time with the balm of sulphur.

The chief features of the invention consist in the use of the balm of sulphur for rendering fabrics air and water-proof, and in preparing the balm in the following manner:—When the siccative or common drying oil has boiled for about two hours, in order to thicken it and separate its mucilaginous parts it is left a few days to settle, previous to decantation; then ten parts, by weight, are taken and submitted to slow boiling, during which small quantities of flowers of sulphur are added, and agitation is kept up the whole time. When from one to two parts of flowers of sulphur have been thus thrown in small quantities into the oily mixture, a transformation soon takes place, and the balm of sulphur now assumes a homogeneous mass of a brownish color, cohesive and elastic, somewhat like india rubber. The constituents of this composition or coating are then the following (by weight):—Ten parts of siccative thickened linseed oil, and from one to two parts of sulphur in powder. The balm of sulphur, thus prepared, is used as the coating, and liquified either by the action of heat, or by means of solvents, such as spirits of turpentine, naphtha, &c. When it is desired to obtain a harder coating, gallipot gum, yellow amber and resin, &c., may be added.

The fabric to be coated is dipped into the material when hot, and in the liquid state, from which it is withdrawn and made to pass between six scrapers adjusted transversely above the vessel, so that any excess of the material is removed, and drops into the vessel again.

Sulphurized Oil Paint.—At a recent meeting of the Society of British Architects, J. B. Daines stated that by subjecting 8 parts (by weight) of linseed oil and 1 part of sulphur to a temperature of 278°, in an iron vessel, he obtained a species of paint possessing singularly preservative properties. Applied to the surface of a building with a brush it effectually keeps out air and moisture, prevents deposits of soot and dirt, and preserves the beauty of the stone, wood or brickwork to which it is applied.

It has long been known that a portion of sulphur can be dissolved in oil, but until recently such a composition, as a paint or varnish, has attracted no notice, in fact, its preservative and impervious qualities when dry were unknown. It is well known to chemists that sulphur (the substance employed to give *body* to the oil) is unalterable in the air, and is not acted upon by moisture, hence its quality as a preservative for coating the outside of structures exposed to the weather. It is capable of preserving plaster of Paris figures exposed to the air, also monuments, and buildings of the brown free-stone, which are liable to detrition from the action of the weather. It is stated that it improves the color of the stone to which it is applied, as well as preserves it, therefore it is a most useful paint, and deserves to be very generally employed.

Engineers and Firemen.—In a communication to the Paris Academy of Sciences, Dr. Duchesne states that engineers and firemen on locomotives improve in health and grow stout during the first two years of their employment, but after this period a dangerous change takes place in their health. Among the earliest unfavorable symptoms are a weakening of sight, loss of hearing, and rheumatic pains, chiefly on the right side. These are followed by pain, and a difficulty of standing while the locomotive is in motion. We have never heard of American railroad engineers being affected in this manner.

Salt in Dyeing.—F. A. Gatty, of Accrington, Eng., has taken out a patent for the use of common salt (chloride of sodium) in dyeing with garancine, alizarine, and other preparations of madder. One pound of the salt is employed to every twenty-five pounds of the garancine in the boiler or a vat. The salt, it is stated, produces more beautiful and permanent colors. Some of our country dyers employ salt in coloring woolen goods black.

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New Inventions.

Micro-Geology.

The celebrated German naturalist, Ehrenberg, has made a very curious contribution to micro-geology, by the discovery that a large proportion of the various *green* sands, which are found in some stratified deposits, is composed of the *casts* of microscopic shells, the shells themselves having entirely disappeared. The material of these casts is chiefly silex, colored with the silicate of iron.

Wrought Iron C rs.

There is now nearly completed in Patterson, N. J., a first class passenger car a little larger than the ordinary size, constructed almost entirely of wrought iron. This material is employed to obtain great strength, with less weight than usual, and to avoid the injuries to passengers due to the destruction of ordinary cars in any kind of a smash. The experiment, which is being conducted on a most liberal scale, and with a view to establish conclusively the practical superiority of this system, is made at the expense of Mr. E. W. Sargent, a merchant of this city, under the patent of Dr. B. J. LaMothe. The framework is in effect an extremely strong and stiff, yet elastic, basket, each joint or intersection being strengthened by rivets, and the whole being further protected by making the entire platform at each end one strong spring of steel. If the construction runs off the track, falls down a precipice, or comes into collision with another in such manner that the springs at the ends cannot absorb the shock, the car itself will spring, collapse, twist or crumple up, but cannot break and crush its contents with the fragments. One of the great dangers in collisions, &c., arises from the disposition of ordinary cars to penetrate each other with their timbers, or to shut together like the parts of a telescope, and another arises from the facility with which the tops and sides, the seats, &c., separate from the more substantial floors, and are precipitated forward with the passengers. Neither of these, nor many other minor evils, could arise from any violence to this style of car, which is also much lighter than the wooden ones, and thus will absorb far less power in hauling it. The car is constructed entirely of strips, so connected as to be practically without joints. We hope to see this car perfectly successful in practice, and that it may revolutionize the mode of constructing these important carriers of human freight. The principle is beyond doubt an excellent one.

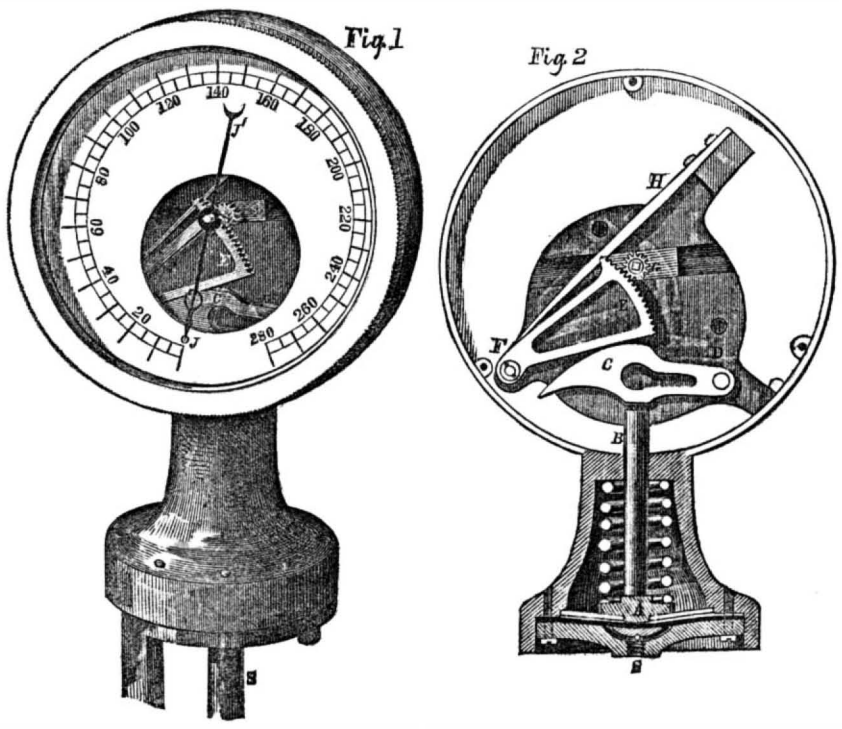
Improved Steam Gage.

The accompanying engraving represents a Steam Gage invented by Samuel W. Brown, of Lowell, Mass., and secured by Letters Patent dated June 11, 1856. It is one of the forms in which the pressure of the steam acts to compress a spring, and in which the motion is increased, and rendered plainly apparent to the eye by the aid of gearing and a suitable index on a dial. Unlike other forms of these instruments, however, the graduations are equally, or nearly equally, distant, in all parts of the dial. This is accomplished by the peculiar leverage employed, which will be described below.

The resistance of a spring either to extension or compression, increases a little more rapidly than in a direct proportion to the extent of flexure. This may be observed in the "Salter balance," as it is sometimes called, where weight is ascertained by the effect it produces on a coiled spring contained in a small case. Without some means of compensating therefor, the graduations on either a spring balance or a steam gage include a less space for a given change under great weights, or at high pressures, than when the spring is less severely strained.

A represents a flexible diaphragm, protected as well as practicable, by metal, from cracking and rupture, and free to receive on its lower surface the pressure of the steam (or of water acted on by the steam) which is admitted through a suitable pipe, S, below. B is a stem or cylindrical rod rising from A, and surrounded by a stout coiled spring, as represented, which tends continually to depress it. C is a lever hinged to the fixed point, D, with its upper face rounded. E is a sector of a gear wheel, mounted on the fixed center, F, and with a face presented to C, in such manner that as C and E are raised by the action of B, *the leverage of C gradually decreases in a ratio which exactly compensates for the diminution of its motion*, so that the position of the gearing on the periphery of E is precisely proportional to the pressure of the steam. G is a small gear wheel and shaft which carries the index, J J′ and by this

BROWN'S STEAM GAGE.



means indicates exactly the pressure. H is a slender spring, which acts on E with sufficient intensity to overcome the slight friction and insure its falling back, whenever the pressure of the steam is lowered and B is depressed by the action of the stout coiled spring.

The whole is very strongly and neatly housed in a metallic casing, and all the appointments appear very neat and durable. A portion of the face of the dial is left open as represented, in order to see that all the parts are in perfect order. The gear wheel, G, is mounted in a block, so that it may be traversed in a groove across the gage, to facilitate any adjustment which may be necessary.

For further information relating to this gage address the inventor, S. W. Brown, as above.

SHAW'S PENDULOUS CHURN.

The accompanying engraving represents a novel device for agitating cream, invented by Charles A. Shaw, of Biddeford Me. and patented December 9, 1856.

It is designed to agitate the cream in fully as efficient and rapid a manner as in common churns, and to perform this by a motion which is considerably easier for the operator. The motion of the ordinary vertical dasher is quite unnatural, and severe on the muscles. A back and forward motion, as in working a pendulum, is far more agreeable, and is that in which the power of the hand is applied in this invention.

The apparatus consists of a cylindrical churn, A, suspended by means of the two slotted bars, B, and the pins, C, to the simple frame represented. D is a portion of a gear wheel which is fixed on B, and consequently oscillates therewith. E is a smaller gear wheel, and the effect of this gearing is to give to the arm, F, by the rocking of B, a sychronous and greater degree of motion. G is a link connecting the extremity of F with the cross head, H, the ends of which latter travel in the slots represented in B, so that the motion of the cross head is necessarily in line with the axis of the churn, however much the churn may be inclined to either side by its pendulous motion. I is a rod connected to the dasher of the churn in the ordinary manner. J is a guide secured in the lower extremities of the slots by the pins, K. L is a rod connected by a simple hook to the lower side of the churn, by which the churn may be swung to and fro. This is the only motion required in churning. The swinging of the frame, B, imparts a considerably increased motion to F, which moves the cross head, H, and rod, I, up and down at each stroke. There is a thread or spiral on the rod, I, which travels in a corresponding groove in J, as represented, so that as the churn dasher rises and falls it is rotated alternately in opposite directions, in order the better to agitate the fluid within.

The whole is cheaply and simply constructed, and may be easily repaired by any person of ordinary ingenuity in case of failure of any part, which, however, is not likely. The strains are slight, and the motion easy, and we should presume that this churn would prove very much easier to operate than those working by the vertical motion of the hand.

For further information address the inventor as above.

The New Cent.

This new coin is a valuable institution, and we rejoice in anticipating the decrease of the ugly old "verdigris" cent, which encumbered our *change* for such a number of years. The southern and western cities have always ignored the copper cent, the three cent piece being their smallest circulating medium. But the little coin just issued bids fair to receive a hearty welcome at their hands. A large quantity have been forwarded thitherward. But small although the new cent is, in comparison with the "old red," it is singular that our coins of the least value should still be so large. Why should the one cent coin be so much larger than the three cent pieces? There is still room for improvement in this respect. Commencing with one cent as the coin of least value, it should be smallest in size, and all the others be proportioned in dimensions according to their value. There would be some harmony in such a system of coinage as this.

Toy Balloons.

On page 164, this Vol., Scientific American, we described the miniature toy balloons which had been introduced with such success into Paris during the holidays of last winter, and suggested their introduction into our cities, as pleasing and beautiful toys to delight Young America. Quite recently they have come into pretty general circulation, and may be seen in various store windows in our city being placed there as quite novel features of attraction.

A number of our boys who have purchased such balloons have been rather astonished to find them daily growing beautifully less in size, and prematurely old in wrinkles, and at last ceasing to be balloons at all. The cause of this is the percolation of the inflating gas (hydrogen) through the pores of the balloon. This gas is so subtle that it will percolate through the pores of metals, goldbeater's skins, india rubber, and the closest and finest known membraneous substances.

Gun Igniters.

There are now extensively manufactured near Vienna, instruments used in lieu of percussion caps, but which are fitted within instead of upon the nipple of the gun. They are represented as exploding just as easy as percussion caps, are perfectly waterproof, and the whole, consisting only of a peculiar chemical composition, leave, when exploded, no residuum whatever behind, and instead of choking up, rather tend to clean the nipple.

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Scientific American.

NEW YORK, JUNE 13, 1857.

"Inventors and Inventions."

The New York *Daily Times* has recently exhibited a marked antipathy towards inventors, by maligning their character and depreciating their labors. When the fact is taken into consideration that no class of men have done more—if any other has done as much—to advance science, art, and civilization, it is strange that it or any periodical should be guilty of such conduct. We cannot account for this exhibition of its spleen towards such a deserving body of men upon any other hypothesis than to consider it an effort to wipe out the stain upon its escutcheon, which it contracted by its indiscriminate laudations of a once celebrated but now defunct mechanical *ignis fatuus*. It must have a bitter recollection of the excitement to which it was a party, when its chief editor was betrayed into the inglorious position of lecturer for the "hot air engine," and of the deception then practised upon the public. Then it dilated eloquently on the glorious achievements of inventors, now it indiscriminately denounces them and their productions. The former it now exhibits in the character of scoundrels, bigots, and mercenary prowlers on the community; the latter, in "forty nine cases out of fifty," as unpractical and useless mantraps, got up for the purpose of deceiving the public. No person can come to any other conclusions than these, we believe, respecting the sentiments given to the world by the *Times*, in an article under the above caption which appeared in its columns on the 1st inst. Its whole tenor is intended to excite prejudice against poor inventors, by raising suspicions against them. It asserts that there "are swarms" of quack and "confidence inventors," who "swindle the community out of an annual aggregate of millions." It does not instance a single case of the kind, but it dogmatically avows this to be a fact. We are positive it is an assertion devoid of the least confidence. There are, no doubt, some rogues who trade in inventions, just as there are in every other business, but would it be right to denounce all our merchants as a set of quacks and "confidence men" because some of them are dishonest? And yet this is what the *Times* has done in essence and principle respecting inventors. The great majority of our inventors, we can safely assert from a long and intimate acquaintance with them, are honest and simple minded men, more liable to be imposed upon than to impose upon others.

Every new invention brought before the public should receive a careful examination, and its author a candid hearing, and the more so if he is a poor inventor, because his invention may be of the greatest value to the world, and for want of means he may not be able to bring it into use. The *Times* inculcates the doctrine that if an inventor is poor it is sufficient grounds to be suspicious of him, and the practicability of his invention. It assumes that good inventions introduce themselves, and it instances the cases of railroads, telegraphs, and printing presses, which it asserts came into use *immediately* after their practicability was demonstrated. If the whole community possessed such feelings towards inventors as the *Times* apparently does, these inventions would not yet have come into use. It was good for the world that the inventor of the steam engine found such a wealthy man as Bolton to examine his discovery, and take him by the hand, and still he labored in vain for years to convince many other persons that his invention possessed merit. It was good for the commercial community that the inventor of the telegraph was assisted by government to construct his first line between Washington and Baltimore, for he had not the means to do it himself. Inventions are indeed more easily introduced now than in bygone years; but their merits are not always so quickly appreciated, as the *Times* would have the public understand. Had Messrs. Hoe not possessed the means and ability to construct their improved printing presses, the daily papers of this and other cities, in all likelihood, would still be jogging along with their old slow Napiers. It requires considerable energy, tact and expense to introduce almost every new invention, however good, and the *Times* admits this, but not without indulging a fling at inventors. It asserts that one cause tending to prevent the introduction of a new invention, when investigated, "will be found in the inventor having no capacity himself to explain the merits of his invention, or to interest in it persons of means and intelligence; and that while he will acknowledge, theoretically, the rareness and indispensibility to his success of the capacity he lacks, he is so mean as to be unwilling to pay liberally those who do possess it, either in money or in a fair share of his invention. Or that he is at bottom a dishonest, worthless fellow, such, at any rate, has been our experience."

Here is where the whole difficulty lies. A person once deceived with a project, no matter how, when he discovers his error, generally becomes soured against everything related even in name, to the object of his misplaced confidence. This appears to be the case with the *Times*. That unfortunate affair to which we have alluded, once the object of its frothy laudations, is now apparently its standard in judging of all inventions, and the scheme itself the platform on which it places all inventors and persons interested in inventions. Of course, it now sees a rogue in every inventor, and a deception in every invention.

It is well known that quite a number of inventors have made fortunes. This fact seems to have fermented the envy of the *Times*, and it throws out the insinuation that they have been overpaid for what they have done. It instances Colt, Goodyear, Wilder, Sharpe and McCormick as fortunate individuals, who have made immense fortunes by their patents. We are glad to hear of it, and can add a long list of other inventors who have also amassed fortunes by their discoveries, and we still more rejoice that the number of such is vastly on the increase—thanks to the facilities now enjoyed by them for bringing the merits of their inventions before the public. Every well informed man of noble impulses will also rejoice at the rewards they have received, and not grudge them, like the *Times*. But the public have been far greater gainers, by new inventions, than inventors—personally considered—even the most fortunate of them. What in comparison have been their pecuniary rewards to the advantages they have conferred upon the public? A mere dew-drop to the waters of the ocean.

Artificial Sapphires and Rubies.

Some very beautiful gems have been manufactured artificially, such as the *lapis lazuli*, but the most esteemed and valuable precious stones have hitherto resisted all the synthetical skill of the chemist. Diamonds have been made the subject of thousands of experiments to manufacture, but hitherto without success. Other precious stones have also largely engaged the attention of the chemist, and the sapphire, it is stated in some of our foreign exchanges, has at last yielded to the perseverance and skill of M. A. Gaudin, of Paris, who has communicated the result of his experiments to the Academy of Sciences. The following is stated to be the method by which he obtains it:—

A common Paris crucible is coated in the interior with lampblack, and equal parts of calcined alum and sulphate of potash reduced to powder are introduced into it. The crucible is then closed, and exposed for about a quarter of an hour to an intense heat in the fire of a blast furnace, when it is taken out and cooled. On breaking the crucible the lampblack coating is found covered with numerous small and brilliant crystals, composed of the sulphuret of potassium enveloping crystals of alumina, which are of the same composition as sapphires, and are transparent and almost colorless. The size of these crystals is in proportion to the mass of material operated upon—the greater the quantity, the larger the crystals. It is also stated that they are so hard as to have been found preferable to rubies for chronometers by some of the French watchmakers.

There is still a very wide field open to the chemist for the manufacture of those hard and fine gems employed in jewelry, which have hitherto been furnished only from the laboratory of nature. These stones make the most durable and finest bearings for watches and chronometers, and were they cheaper, and could be manufactured of large size and made easily into bearing boxes, they would be employed in clocks of every description, and other machines, and thus lead to great improvements in the accuracy of their operations.

The composition of the sapphire is pure alumina—the same as the metal which has recently become so famous. It remains unaltered before the blow pipe, but it fuses with borax—not easily however. The true sapphire, so called, is of a blue color, but the name is sometimes applied to the clear crystals. Alumina is called ruby when of a red color, the topaz when yellow, the emerald when green, the amethist when violet; the dingy colored crystals are called corundum, and the grey, emery.

Alumina forms the basis of the great majority of precious stones. The sapphire is next to the diamond in hardness, and it scratches quartz and glass with facility. It is generally found loose in the soil, or in the debris of mica slate. It has been found in several places in the United States, but not sufficiently beautiful (except in Georgia) to form a gem. The red sapphire is the most highly prized, and the finer qualities are nearly as valuable as the diamond.

Electro-Magnetism as a Motive Power.

This question has at various periods, and by impulses apparently, excited the scientific world. The experiments of Professor Jacobi, in Russia, Professor Botto, of Turin, Favre, in France, Ritchie, in Scotland, Joule, in England, and those of Henry, Page, and others, in our country, have heretofore caused a great amount of interest, but they have as yet resulted in no economical application of electro-magnetic motors. After a quietude of some years, it is now attracting some attention again, both in the Old World and the New. On the afternoon of Thursday last week, a series of experiments were conducted at the Crystal Palace, in this city, with Professor M. Vergnes's electro-magnetic engine. The form of this engine is similar to that of two spoke wheels, secured on one shaft, supported in a wall on each side. The principle of its operation—the form only being different—is similar to Professor V.'s engine illustrated on page 184, Vol. 9, SCIENTIFIC AMERICAN. Previous to the machines being set in operation, the Professor delivered a brief and interesting lecture to a select audience present, explaining the principles of his invention. He asserted that, as a motive agent, it was superior to the steam engine—that it was an engine of the sixth power. In other words, if its dimensions were doubled, and the battery increased in the same proportion, the gain would be as the multiplication of the cube into the cube.

The experiments did not convince us that his theory on this point was correct. A small engine was set in motion with thirty-two cups of a battery; it was stopped by the application of a friction brake, six inches radius to its axle, and 5·5 lbs. on the lever. The large engine was then set in motion with the same battery force, and its revolutions were twenty per minute, with four boxes of cups (16 to the box) its revolutions were forty-three per minute; six boxes of cups, sixty-one revolutions; eight boxes, eighty revolutions. Thus, with twice the number of cups, twice the velocity was obtained. If we suppose the weight of the magnets (1500 lbs.) to represent a constant pressure in pounds, with twice the amount of battery force, there was just twice the amount of power developed.

We were, however, satisfied on one point, viz., that Professor Vergnes had constructed and put in motion the most simple and best electro-magnetic engine we have yet seen, but not as to its working expenses. A steam engine, well constructed, can be run at an expense for fuel of only four pounds of coal per hour for each horse power, or 400 pounds for a ten horse engine running ten hours per day—only one dollar for cost of fuel. The battery of no electro-magnetic engine we have yet seen can be maintained at such a small cost—no, not by a very high figure. Professor Vergnes has made some important improvements in his batteries. He has removed their disagreeable odor; and when we consider that Sir Humphrey Davy employed a thousand plates to accomplish the same results that are now obtained with twelve, we entertain the hope that something practically economical in electro-magnetic engines may yet be accomplished.

Ever since the discovery was made that the electric current could be converted into power and give motion to machinery, it has been expected, by proper direction, to supersede the steam engine, and certainly none would rejoice more than ourselves to witness such an achievement. In electro-magnetic engines no explosions can take place; there is no suffocating heat generated, and no danger from fire. Could they be operated, even at twice the working expenses of steam engines, they would be preferable for many purposes.

The Frigate Niagara—New York Regatta—George Steers.

The lamented George Steers was certainly a great nautical luminary. Vessels which he designed and built have achieved the greatest naval triumphs of modern times. In the regatta which took place in the New York Bay on the 4th inst., three yachts built by him carried off the three first prizes.

The rule which has recently been adopted to judge the sailing qualities of vessels, by the Club, is the amount of square yards of canvas carried, according to the tunnage; it being evident that the vessel which sails fastest with the least amount of sail spread according to its tunnage, must be the best sailer.

The British papers are loud in their praises of the frigate Niagara, also designed by George Steers. The London *Times* says, respecting her:—"In size, form, speed, and intended armament, the Niagara is, beyond doubt, the first man-of-war of her class in the world. . . . Not until the visitor has walked forward and perched himself somewhere near the bowsprit, can he fully appreciate her immense size and beautiful form, and feel that he is looking down on such a war steamer as the world has not seen the equal of, and by the side of which the English navy can show nothing to compete."

It seems that the Niagara was *hove to* four days to repair the rigging on her voyage across the Atlantic; this is one good reason why she was eighteen days on the passage. The London *Times* praises the Niagara from stem to stern—engines, arrangements, and everything about her. It is very gratifying to our feelings to hear Uncle John acknowledge that our ships are still entitled to carry the broom at the top-mast.

Water of Artesian Wells.

Mr. I. H. Stearns, writing to us from Augusta, Ga., states that in South Carolina, where he has bored a number of artesian wells, it is very common to find the water so impregnated with sulphretted hydrogen as to render it unfit for use when first taken from the well; but this evil is removed by allowing the water to stand for a few hours in an open vessel, exposed to the air—this gas being in a free state, escapes, leaving the water very pure, and fit for drinking. He suggests that the water of artesian wells in other localities which has been found impregnated with the same gas, and condemned as unfit for domestic use, may in the same manner, be rendered perfectly drinkable.

Reckless Destruction of Property.

If we witnessed a number of persons making bonfires of their movable property, we would certainly consider them *non compos mentis*. The great amount of property annually distroyed by fires in our country exhibits our people in a light no less unfavorable. On the 4th inst., $300,000 worth of sugar, molasses, &c., were destroyed in one storehouse in Brooklyn.

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Sphygmoscope.

The accompanying figures illustrate a new instrument for indicating the movements of the heart and blood vessels, invented by Dr. Scott Alison, London.

The sphygmoscope consists of a small chamber containing alcohol, or other liquid, provided with a thin india rubber wall, where it is to be applied to the chest. At the opposite extremity the chamber communicates with a glass tube, which rises to some hight above its level—the chamber. Liquid is supplied to the instrument until it stands in the tube a little above the level of the chamber. The pressure of the column of liquid in the tube acts upon the elastic or yielding wall of india rubber, and causes it to protrude. This protruding part, or chest-piece, is very readily affected by external impulse; it yields to the slightest touch, and, being pushed inwards, causes a displacement of the liquid in the non-elastic chamber, and forces a portion of liquid up the tube. The protruding wall of india rubber is driven inwards when it is brought in contact with that portion of the chest which is struck by the apex of the heart, and a rise in the tube takes place. When the heart retires, the india rubber wall, affected by the pressure of the column of liquid in the tube, is pressed back, follows the chest, and permits the liquid to descend. The degree to which the india rubber wall is forced in by the tube, and the amount of protrusion of the india rubber wall which takes place when the heart retires is denoted by a corresponding fall in the tube. The tube is supplied with a graduated scale, to denote the rise and fall with exactitude. The glass tube is provided at the top with a brass screw and collar, to prevent the egress of the liquid when the instrument is not in use, or a bulb with an orifice may be supplied. When employed, the glass tube is left open to permit of the passage of the air to and fro.

Fig. 1 represents an instrument without a a stand; fig. 2 is another form of it without a stand; and fig. 3 is the most perfect form, but is not quite so convenient.

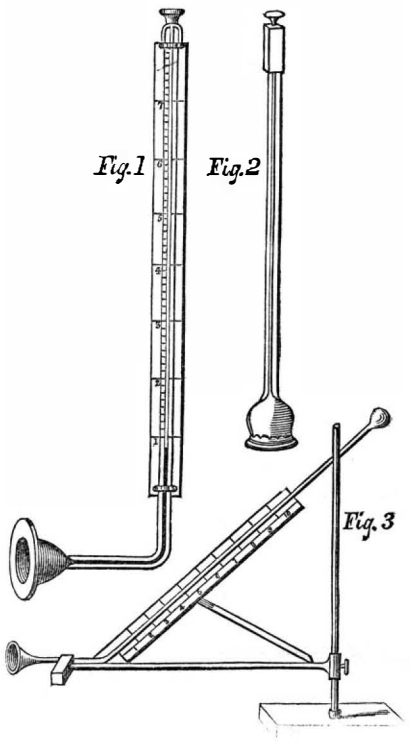
The glass tube is a foot or more long, and the round bore is about the one-eighth part of an inch. If the bore be much larger, the movement will be inconsiderable; if much less, capillary attraction will interfere and prevent free motion.

When the instrument (fig. 3.) is to be employed, mounted upon its stand, it is placed upon a firm table with the chamber projecting beyond it. The person whose heart is to be examined is seated upon a firm chair, with his chest erect and free from motion. The protruding india rubber wall of the chamber, or chest-piece, is delicately made to receive the blow of the apex of the heart. The liquid in the tube is now observed to be in motion. With persons in ordinary health, the liquid rises and falls about an inch. This rise and fall, after taking place three or four times, is followed by a much longer rise and fall to the extent of three or four inches, due to the advancement and retirement of the wall of the chest during the acts of respiration. The shorter rise and fall are again repeated, and are again followed by the longer rise and fall caused by the motions of the chest. During the longer rise and fall due to respiration, the beat and retreat of the heart are still to be recognized by brief interruptions in the rise and fall of the liquid. Thin persons are very favorable for examination; on the other hand, the corpulent, less readily affect the instrument.—Placed upon the heart it indicates strokes of that organ which are so feeble as to have no corresponding pulse at the wrist.

No pause whatever in the movement of the liquid has been at any time observed when the sphygmoscope has been carefully placed so as to receive the full beat, and fall back with freedom. This would go to show that the heart, however slow, is in constant motion, and, contrary to the belief of many physiologists, enjoys no pause. There is no pause in the descent of the liquid, which takes place when the heart retires from the thoracic walls, in the middle of which movement it has been said a very short pause is to be observed in living animals having the heart exposed.

When the heart is excited, the liquid in the sphygmoscope rises and falls more than usual; but the rise and fall of the excited enlarged heart is much the same as the rise and fall of the excited normal organ. For the most part, the enlarged heart gives movements to the instrument when placed upon the ribs and sternum, whilst the normally sized heart affects it more exclusively when it is placed upon the fifth intercostal space.

The sphygmoscope indicates with exactitude both the absolute and the comparative influences upon the heart, of food, cordials, stimulants, and tonic medicines. It does the same in respect to depressing causes, such as hunger, cold, and sedatives. With the aid of this instrument the fact is demonstrated that the action of the heart may be great when the pulse is small, that the heart may strike the instrument with force when the pulse scarcely affects the liquid of the hand sphygmoscope. It affords proof that the pulse is one thing, and the heart's action another, and teaches that the pulse is only an approximate sign of the state of the heart. It is found also, that while cold at the surface and extremities may depress the pulse, the heart may remain little



enfeebled, or even become excited, and that warmth and friction applied to the extremities may cause an excited pulse without there being any accompanying increased force of the heart.

The sphygmoscope (fig. 2,) having a level elastic wall instead of a protruding one, and having a glass tube with an almost capillary bore, forms a remarkably delicate indicator of the pulse. It is so delicate in its impressions that it is appreciably affected by the regurgitant wave in the jugular veins, and by the wave in arteries much smaller than the radial. From its nicety in manifesting the beat of the blood-wave, it is very valuable.

By means of this hand instrument applied to the arteries a comparison is readily made between the time of the beat of the heart and the rise of the arteries under the influence of the blood-wave. This instrument is much more delicate than the finger in such an inquiry. The impressions made upon the fingers of two hands fail to be conveyed with sufficient nicety to the mind to tell with certainty the relative time of the beat of the heart and arteries. Except in cases of extreme slowness, the sensations obtained from the two hands impressed at nearly the same time, do not admit of a distinct difference in respect to time being made out. It has been to this very defect the erroneous idea, that the beat of the heart and the beat of the pulse are synchronous, or nearly so, owes its origin and continuance.

The hand sphygmoscope placed upon the the radial artery, shows a rise of the liquid while there is a fall in the sphygmoscope placed over the heart. As the liquid in the one instrument starts from below, the liquid in the other starts from above, and as the liquid in the one reaches the top of its ascent, the liquid in the other reaches the bottom of its descent, to renew their opposing course. The movements in the two instruments at the same instant are always opposed, and the whole time occupied in the movement of one instrument in one direction appears to be occupied by the movement of the other in the opposite direction. The movements *alternate* with as much apparent exactitude as the arms of a well-adjusted balance. When the lapse of time between the beat of the heart and the pulse at the wrist was first observed, suspicion of disease of the aorta was entertained, but the subsequent examination of many persons proved that this alternation was natural. In some twenty persons subjected to examination, the complete alternation has been made out without the shadow of a doubt. These persons were of all ages above childhood, and had the pulse of different degrees of rapidity, from 60 to 100.

Hand sphygmoscopes placed upon the carotid, the barachial, the radial, the femoral, and the dorsal artery of the foot, rise at the same instant, and fall at the same point of time.

These facts prove the existence of two great laws not previously enunciated—first, that the heart's beat alternates with the pulse at the wrist; secondly, that the pulse of arteries beyond the chest takes place in all parts at the same instant, and without any appreciable interval.

The sphygmoscope forms a good pneumoscope. It delicately measures the rise and fall of the chest in respiration. It likewise declares the relative duration of inspiration and expiration, and may thus prove useful in the detection of incipient phthisis, and other pulmonary diseases. When the liquid has attained its highest elevation at the end of inspiration, it immediately begins to fall; but when it has reached the lowest point at the end of expiration it remains there some instants. The ascent is slower than the descent. After the fall of an ordinary expiration a forced expiration gives a second fall.

The sphygmoscope (fig. 1,) may be employed without a stand, and is then more portable; but from the want of a fixed basis, and from the motion of the ribs on which it must rest, its manifestations are less extensive and satisfactory. When employed without a stand, as it must rest upon the ribs, the elastic wall of the chamber should be plain, and not protruding.

The Mental Faculties and Phrenology.

Our actual experience of the human mind is only as we find it in combination with corporeal organs. Sir Benjamin Brodie places its seat in the brain, which he states is composed of a congeries of organs, each having its peculiar function, and yet, he believes, that what has been taught as the science of phrenology has no foundation in fact. He says:—

"Now, there are two simple anatomical facts which the founders of this system have overlooked, or with which they were probably unacquainted, and which of themselves afford a sufficient contradiction of it. First, They refer the mere animal propensities chiefly to the posterior lobes and the intellectual faculties to the anterior lobes of the cerebrum; but the fact is, that the posterior lobes exist only in the human brain, and in that of some of the tribe of monkeys, and are absolutely wanting in quadrupeds. Of this there is no more doubt than there is of any other of the best established facts in anatomy; so that, if phrenology be here, the most marked distinction between man on the one hand, and a cat or a horse, or a sheep, on the other, it ought to be, that the former has the animal propensities developed to their fullest extent, and that these are deficient in the latter. Second, Birds have various propensities and faculties in common with us, and in the writings of phrenologists many of their illustrations are derived from this class of vertebral animals; but the structure of the bird's brain is essentially different, not only from that of the human brain, but from that of the brain of the mammalia generally."

And yet, if it is admitted that the brain is a congeries of organs, it seems to us that there is a foundation for the science of phrenology. As a science, however, it must be very uncertain, because it is principally based on the formation of the casket which contains the organs, not the organs themselves.

Cremona Violins.

We are indebted to Mr. W. Hudswell, of this city, for posting us up somewhat on the above subject. Dr. Lee, who was lecturer in St. Thomas' Hospital, London, and an accomplished amateur performer on the violin entertained a great passion for the instruments themselves, and made hundreds of experiments to find out the cause of the superiority of tone in the Cremona. He had a fine Cremona taken to pieces, and a number of new instruments made in every part exactly like it, and yet none of them equalled it in tone. He thus found out that it was not a particular form which gave these instruments a superiority over all others. He then experimented with various kinds of wood, and also treated the same sort of wood in various ways, in order to discover if this was the cause. For example, he steeped some in alcohol, others in oil, then dried them, and had them made of the genuine Cremona shape. All these efforts however, were vain; the old Cremona sung sweetly over them all. At last it struck him that there might be something in the varnish connected with the subject, and he discovered that *amber* varnish was the coating of old Cremo. To work at varnishes he then went, (for he was a determined experimenter and a good chemist, and at last he made a grand hit. By making amber varnish in the same way that copal varnish is made, namely, by heating the amber, then pouring hot oil upon it, he obtained a varnish which, when applied to his violins, improved their tones in a wonderful manner. This varnish takes a long time to become perfectly dry. The violins to which it is applied have to be hung up in the open air for months before they lose their tacky character, but when perfectly dry it is the grand solvent of the Cremona's superiority. Severia, the famous violinist, and pupil of Paganini was presented with one of Dr. Lee's violins, and he declared it was equal to a Cremona; of twenty violins in his possession it was excelled only by one, while it was superior to all the others.

Gum and Starch.

Chemistry is the most wonderful of all sciences, abounding as it does in such curious transformations. There is the substance *starch* so generally used, and so universally known. It is not soluble in water, but by a very simple process, it can be converted into a gum, known by the name of "dextrine." The process for accomplishing this result may be varied, but the following is among the most simple and recent:—

It consists in moistening one tun of dry starch with water containing four and one-half pounds of strong nitric acid. The starch, thus uniformly wetted, is made up into small bricks or loaves, and dried in a stove. It is then rubbed down into a coarse powder, and exposed in a room to a stream of air heated to about 160 degrees Fahr. Being now triturated, sifted, and heated in an oven to about 228 degrees, it forms a perfect dextrine of a fair color, and soluble in water.

Dextrine is now extensively employed in giving body and adhesive qualities to colors employed in printed paper, calicos and woolen fabrics. It is also used for dressing colored muslins, also as a paste or size for painters, and for many purposes as a substitute for gum-arabic and fine glue, it being so much cheaper than these substances. By moisture and heat alone in an oven, starch may also be converted into dextrine

Western Grain.

The *Chicago Magazine* (a new and very useful monthly) states that 20,086,616 bushels of grain were exported from that city last year. It also says: "It has been estimated that the average amount of grain transported each season between Chicago and Buffalo is 150,000 bushels by a good propeller, and 80,000 by a brig." At this rate, the above amount of grain requires a marine equal to 50 propellers and 150 brigs to transport it to the Eastern markets, supposing each to make but one trip during the season.

We would call the attention of our readers to the advertisement of the "American Fire Alarm Telegraph" in another column.

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W. A. T., of N. H.—There is no good work published in our country on cotton and wool dyeing.

C. P. H., of Pa.—It is not in our line of profession to advise with parties concerning infringements.

J. M. H., of Ill.—There are already existing patents for rolling up the sail on the yard. The plan has been in use several years with good success on many English ships.

J. C., of Ill.—Ventilated shoes are very common in this market, and would answer a good purpose for obviating the difficulties of which you complain.

J. L. M., of Pa.—We are not engaged in buying or selling patents, and would refer you to such parties as you may find advertising in our columns.

R. U. P., of Mass.—If you will send us a description of your safety tube for fluid lamps we will advise you as to its novelty and patentability. There are already several patents in existence for obviating the same defect in lamps, but your plan may be superior to any of them.

J. W., of Pa.—Your apparatus is substantially on the same principle as most of the gas regulators in use. These prevent the blowing of the gas, and equalize the pressure on the burners, but do not prevent the flickering complained of in our article.

M. C. B., of Pa.—We know of no machine for cleaning bottles by steam; but H. N. DeGraw, Green Island, N. Y., has a capital invention for cleaning them with water.

E. E. A., of Iowa—D'Aubuisson's Hydraulics, translated from the French by Joseph Bennes, C. E., and others, is the best work we know for young millwrights. We cannot buy it for you. We do not know the price. Little, Brown & Co., Boston, are the publishers.

N. B., of N. Y.—A sheet iron pipe fifteen inches in diameter, should answer for your boiler of 16-horse power, in burning saw-dust and chips. We have known this size to answer well for a 20-horse power boiler; it was 35 feet high.

A. F. M., of Pa.—We fail to discover any patentable feature in your rake. Similar braces may be found in rakes now on sale at the agricultural implement warehouses in this city. We are confident that you cannot obtain a patent.

J. E. D., of Ala.—We cannot give you a positive opinion respecting the durable qualities of Ross' conical mill for grinding wheat.

C. D., of Phila.—If continuous cotton warps have never been made before, and a person constructs a machine to make them, he can obtain a patent both for the machine and the warp—the latter as a new article of manufacture.

E. A., of Ill.—Common force pumps like those of fire-engines, are the strongest and most simple to be used in cases of fire, for factories driven by water or steam power.

John Wagstaff, of Mercer, Pa., wishes to purchase the best spoke-turning machine in use. Who will supply him? We have similar inquiries very often for spoke-turning lathes, and would recommend some manufacturer to advertise his wares in our columns for a week or two.

R. L., of Wis.—An invention which has been in public use, with the consent of the inventor, for more than two years, is public property—not otherwise.

O. H. W., of Tenn.—The metal of bomb-shells we have been informed, is generally thicker on one side than another; but they can, we believe, be cast of equal thickness throughout. There is, we think, always an increase of thickness around the orifice termed a "rein force."

D. A. M., of Pa.—Dr. Gessner, of Brooklyn, N. Y., has obtained three patents for manufacturing oil from mineral hydro-carbons. Cairn & Bro., of Cloverport, Ky., manufacture coal oil. We are not acquainted with the address of Mr. Young (Scotland) who first obtained a patent for manufacturing oil from coal.

J. H., of Ill.—The endless apron or revolving platform on reaping machines is public property. It is not claimed by Mr. Watson.

G. K. & E., of Ill.—We are not acquainted with Mr. Maingay's process for purifying the water of coal pits.

C. A. H., of Pa.—A varnish composed principally of hot boiled linseed oil and a little heated gum copal is the most durable for outside walnut doors, but it takes a long time to dry.

P. M., of C. W.—Take your pearls to a jeweler; he can tell their value—we cannot.

L. E. W. S., of Ky.—J. Bogardus, this city, manufactures mills for grinding bones. Address him as to their cost.

J. W., of Pa., and J. W., of N. Y.—Independent of their age the Cremona violins are superior to all others. Violin makers use only old, well-seasoned wood for such instruments.

J. P. L., of Va.—Smoothing irons heated by gas, by means of a flexible tube, as you propose, are in common use.

I. T., of N. Y.—The common reel of reapers is not covered by patent.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, June 6, 1857:—

N. A. L., of N. Y., $57; S. & Y., of Ill., $25; D. & M. of Ill., $30; E. H. DeW., of O., $35; H. & G., of Mich., $25; S. L., of N. Y., $30; A. Van D., of N. Y., $25; T. B. B., of S. C., $30; G. S., of L. I., $30; J. H., of N. Y., $30; M. J. F., of N. Y., $50; J. & S., of N. Y., $30; P. N. W., of O., $25; W. H. W., of N. J., $10; A. R. K., of N. Y., $30; H. B., of Pa., $25; A. C., of Ill., $25; E. T. L., of N. Y., $30; J. L., of Pa., $30; J. W. F., of Conn., $25; L. & B., of Mass., $20; E. K. C., of Mass., $20; A. R., of N. Y., $30; S. S. C., of N. H., $250; S. D. H., of N. H., $25; R. G. Jr., of Mass., $25; G. B. M., of Ala., $10; T. & G., of N. Y., $30; W. R., of N. Y., $25; J. M., of O., $30; H. G., of L. I., $30; L. W., of L. I., $40; W. B., of N. Y., $100; D. D. B., of N. Y., $55; G. H. W., of Wis., $55; E. L., of N. J., $30; L. S. C., of N. Y., $25; R. S. J., of Conn., $25; J. W., of O., $25; R. L., of S. C., $25; J. K., of N. J., $30.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, June 6, 1857:

W. E. Jr., of Ill.; D. P., of Ala.; T. B., of L. I.; S. & Y., of Ill.; L. S. C., of N. Y.; A. Van D., of N. Y.; H. & G., of Mich.; E. T. L., of N. Y.; W. H. W., of N. J.; P. N. W., of O.; R. S. J., of Conn.; J. W., of O.; A. C., of Ill.; H. B., of Pa.; N. A. L., of N. Y.; S. D. H., of N. H.; R. G. Jr., of Mass.; G. B. M., of Ala.; R. L., of S. C.; S. G., of N. Y.; C. T. W., of O.; W. & M., of Conn.; D. D. B., of N. Y.; G. H. W. of Wis.

IMPORTANT TO INVENTORS.

The rapid growth of our Patent Agency Business, during the past three years, has required a great addition to our ordinary facilities for its performance, and we are now able to announce the completion of a system which cannot fail to arrest the attention of all who have business of this kind to transact.

OUR PRINCIPAL OFFICE

will be, as usual, at No. 128 Fulton street, New York There is no other city in the Union so easy of access from every quarter as this, consequently there are greater advantages in regard to the transmission of models, funds, &c., through the various channels that center in New York. Two of the partners of our firm reside here, and during the hours of business are always at hand to counsel and advise with inventors. They are assisted by a corps of skillful Examiners, who have had many years of active experience in the preparation of cases for the Patent Office.

To render our Patent Agency Department complete in every respect, we have established a

BRANCH OFFICE IN THE CITY OF WASHINGTON,

on the corner of F and Seventh streets, opposite the United States Patent Office. This office is under the general care of one of the firm, assisted by experienced Examiners. The Branch Office is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington having business at the Patent Office are cordially invited to call at our office.

A SPECIAL REQUEST.

Our facilities for the speedy preparation of cases previous to the application for the patent being much more extensive in New York than at Washington, we especially require that all letters, models and remittances should be made to our address here.

EXAMINATION OF INVENTIONS.

We have been accustomed from the commencement of our business—twelve years since—to examine sketches and descriptions, and give advice in regard to the novelty of new inventions, *without charge*. We also furnish a printed circular of information to all who may wish it, giving instructions as to the proper method which should be adopted in making applications. This practice we shall still continue, and it is our purpose at all times to give such advice freely and candidly to all who apply to us. *In no case will we advise an inventor to make application unless we have confidence in his success before the Patent Office.*

Our extensive experience in mechanical and chemical improvements enables us to decide advisely to nearly one half of the cases presented to us for our opinion, before any expense has occurred in the preparation of the case for a patent.

When doubt exists in regard to the novelty of an invention, we advise in such cases a

PRELIMINARY EXAMINATION

to be made at the Patent Office. We are prepared to conduct such examinations at the Patent Office through our "Branch Agency," upon being furnished with a sketch and discription of the improvement. Our fee for this service will be $5.

After sufficient experience under this system, we confidently recommend it as a safe precautionary step in all cases before application is made for a patent—not that there will be no rejections under the system. It is impossible to avoid such results in many cases, owing to the exceedingly wide range taken by the Examiners in the examination of cases; but, nevertheless, many applicants will be saved the expense of an application by adopting this course. Applicants who expect answers by mail must enclose stamps to pay return postage.

THE COSTS ATTENDING AN APPLICATION

for a Patent through our Agency are very moderate, and great care is exercised in their preparation. No cases are lost for want of care on our part in drawing up the papers, and if the claims are rejected, we enter upon a speedy examination of the reasons assigned by the Commissioner of Patents for the refusal, and make a report to our clients as to the prospects of success by further prosecution.

A circular containing fuller information respecting the method of applying for Patents can be had gratis at either of our offices.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, enclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery Lane, London; 29 Boulevard Saint Martin, Paris, and 3 Rue Thierssienne, Brussels. We think we may safely say that three-fourths of all the European Patents granted to American citizens are procured through our agency.

Inventors will do well to bear in mind that the English law does not require the issue of Patents to inventors. Any one can take a Patent there.

Circulars of information sent free on application.

☞ Remember the SCIENTIFIC AMERICAN PATENT AGENCY, No. 128 Fulton street.

MUNN & COMPANY, Proprietors.

WANTED—A few good workmen, of steady habits, to work on new machinery. Men who can do work well and rapidly will be paid good wages, and find steady employ. Address or apply to J. K. SANBORN, Sandy Hill, Washington co., N. Y. 1*

WANTED—Old Steam Boilers, 36 to 43 inches diameter, ten in number or more, 200 feet in length. Apply to E. WHITNEY, New Haven, Conn. 40 6

VALUABLE WATER PRIVILEGE FOR SALE—Breed's Mills, in the city of Lynn, Mass., nine miles from Boston, about one mile from two depots of the Eastern Railroad, on a never failing stream, discharging on an overshot wheel twenty feet in diameter, six feet bucket, thirty-six feet head and fall—may be increased to fifty-six feet; five mill buildings, three store-houses, six dwelling houses, two barns, and fifty-three acres of land—all for $13,000, or water privilege and mills for $8,000. Apply to GEORGE HOOD, 33 Kirby street, Boston. 40 1*

PECK'S PATENT DROP PRESS—The best machine in use for stamping jewelry, ornaments, tinware, swedging iron, &c. A supply of all sizes on hand and made to order by the patentee, MILO PECK, New Haven, Conn. State rights for sale. 40 4*

WATER POWER TO RENT—On the Hudson River, thirty-six miles from New York, with a room 30x90, also attic and basement, with wing one story high, 25x60. The water wheel is 22 feet in diameter, 10 feet bucket, overshot, with abundance of water. Inquire of EDWARD PAYSON, 52 Beekman st., N. Y. 40 2*

E PLURIBUS UNUM!—S. S. CLARK would respectfully inform the citizens of New York and the public generally that he is stopping at Lovejoy's Hotel, where one of his Exterior Fireproof Folding Window Blind or Shutter models may be seen for a few days only. Mr. Clark verily believes that his invention is one of incalculable value, as his manner of construction and principles of operation are such that cast iron may be used instead of wrought. They are warranted fireproof, and of very ornamental style, completely adapted for dwelling houses, and all other buildings. Mr. Clark would say that contracts for State Rights may be made with him. 1*

AMERICAN FIRE ALARM TELEGRAPH—Under patents to Channing & Farmer of May 4, 1852 and May 19, 1857. Contractors wishing to erect a Signal System, an Alarm System, or both combined, in any northern city, except California cities, Boston and Philadelphia, or in New Orleans, will please address WM. F. CHANNING, Boston. 40 3*

A VOICE FROM CANADA—For $1 in gold I will send a recipe for making all kinds of ink sealing-wax, and wafers; the black ink will cost six cents a gallon. Address JOHN W. VENN, Galt, C. W. 40 2*

PROTECTION AGAINST FIRE may be secured by using the Fountain Pump, one of which should be in every house in the country. Circulars giving full description sent by mail to all who apply. E. AYER. Norwich, Conn. 40 2*

A PUPIL WANTED in an Architect's Office.—Terms favorable. Apply to H. ENGELBERT, architect, 321 Broadway, N. Y. 1*

A WALLET safe against pickpockets or loss sent for $1. DICKINSON & BATE, Hudson, Mich. 40 4*

THE SUBMARINE ARMOR recently used to stop holes and ascertain position of steamer Union, is for sale or rent. Apply to GEO. C. HOWARD, 18th, below Market st., Philadelphia. 39 2*

NEW PATENT for a great improvement for Dressing Sewing Thread, Warp, or Yarn for sale. Address J. D. MINDER, Killingly, Conn., or J. H. WILZUS, No. 2 Cortland st., New York City. 39 2*

L. A. ORCUTT'S, Foundry Furnishing Mill, Albany, N. Y. Foundry Facings and foundry materials of every description. Charcoal $2·25 per barrel, sea coal per bbl. $0·75, soapstone per bbl. $1·50. Also Rectifying Coal, and Russel's Patent Roofing Materials. 39 4*eow

IMPROVED MACHINE for Cleaning and Polishing Table Cutlery, (illustrated in Scientific American, June 6, 1857). This is, beyond doubt, the best Knife Cleaner ever invented; meets with great favor wherever introduced, and is destined to have an extensive sale. The price is only $1·50; a liberal discount to the trade. The Electric Polishing Powder sold with the machine, produces a beautiful silver polish, and is also admirably adapted for cleaning brass, tin, zinc, paint, glass, &c. All orders should be addressed to JAS. WILLCOX, Manufacturers' Depot, No. 715 Chestnut st., Philadelphia, Pa. 38 4*

WOODWORTH PLANERS, STEAM ENgines, &c.—Twenty-seven years' experience enables me to furnish Woodworth Planers for surfacing one or both sides, planing and matching, rabbiting, beading or for moldings or clapboards, in any variety of beautiful construction and great power. Ample evidence of the superiority of my machines will be furnished from parties that have other machines in the same mill. Every machine will be accompanied, if desired, with a written warrantee. As some parties have been supplied with machines of another make when they supposed they were getting mine, I would advise that purchasers should buy none unless my name is on in full. Matteawan steam engines, machinists' tools, cotton and woolen, sash, blind and door machinery, leather banding, &c., furnished at the manufactory at Matteawan, N. Y., or at 62 Courtland street, N. Y. S. B. SCHENCK, Agent. 39

1000 YOUNG MEN can make over 100 per cent. sure profits. Apply (enclosing one stamp) to M. J. COOK, Detroit, Mich. 39 2*

SHAFTING ON HAND and made to order by WM YOUNG, Practical Millwright and Machinist, No. 15 Vandewater st., N. Y. 38 4*

TRUSTEES' SALE—The remaining tools belonging to the estate of John Parshley will be sold at reduced prices, consisting in part of one 12, one 10, one 9, and four 8 ft. planers, three 8 ft., three 7, and one 6 ft. lathe, three hand lathes, one drill press, one gear cutter, patterns, belting, and sundry small tools generally used in a machine shop. Terms cash. N. D. SPERRY, Trustee, New Haven, Conn. 38 4

STEAM ENGINES, Circular Saw Mills, and other Machinery.—Improved engines and boilers, circular saw mills with cast steel mandrels and lever set, with strong iron head blocks—one sawyer cut 1,000 feet inch pine per hour. Sash and Muley saw mills, with rotary feed, Shingle saw mills, self-setting and self-stopping, Siding Mills for making feather-edged siding, Shingle Cutters, Stave Cutters, Stave Jointers for flour barrels, operated by the foot with great rapidity, Bedstead and Chair-making machinery, Broom-handle lathes, Wood-turning lathes, Picket Fence machinery, Bran Dusters, Grain Separators, horizontal Smut machines, and other machinery for mills of all kinds, made on short notice. Contracts for building mills taken, and circulars with cuts sent with further information by addressing L. A. SPALDING, Lockport, Niagara co., N. Y. 38 4*

READ ALL YE THAT ARE FOND OF FISHing—I will send for $1 a secret art of catching fish in any water as fast as you can pull them out. This is no numbug. Address N. R. GARDNER, Peace Dale, R. I. 37 4*

WASHING MACHINE—County and State rights for sale. A few experienced agents wanted. Apply to the inventor, JOSIAH MAYES, Cohoes, N. Y. 37 4*

$1,000 FOR A VALUABLE consideration we have furnished to J. R. STAFFORD, Practical Chemist 16 State st., N. Y. a selection of one hundred of our Choicest Receipts for Cooking, Baking, &c., the same being in constant use in our Hotel. The receipts selected are those which are the best adapted to the use of private families. SIMEON LELAND & CO., Metropolitan Hotel, Broadway, New York. April 6, 1857.

The above receipts have been added to J. R. Stafford's Family Receipt Book, which now contains more than 250 of the most valuable receipts that have ever been published. The above book also contains a chart 23 by 33 inches, on which are 24 splendidly engraved Anatomical illustrations of the Human Body. This magnificent chart should be hung up in every family setting-room. The Book and Chart will be sent free of postage on receipt of 12 cents or stamps, by J. R. STAFFORD, Practical Chemist, 16 State st., New York. 38 tf

COMMERCIAL AGENTS, able and honest men from New England or New York. A. W. HARRISON, Philadelphia, Pa. 35 13*

INGERSOLL'S IMPROVED HAY PRESS—The best portable Hand Power Press in use for the purposes of Baleing Hay, Straw, Broom Corn, Husks, Hair, Hides, Moss, Hemp, Rags, Wool, Cotton, &c. Prices from $50 to $200. Also an improved press for ornamental composition work. Price $50 and $65. Also Ingersoll's Patent Tree Saw, for sawing down trees. This is a perfectly portable machine, and has been thoroughly tested during the past winter. Price $75. All orders filled promptly. Also State and County rights for sale. Circulars containing full information sent on application to the FARMER'S & MECHANIC'S MANUFACTURING CO., Green Point, Kings co., L. I. 37 2*eow

MACHINERY—WM. MONTGOMERY & CO.'S Portable Upright Steam Saw Mills (embracing Lund's patents), price $1,650 and $2,000. Grist Mills, Shingle Machines, Sugar Mills, Pulleys and Shafting, Steam Engines and Boilers, manufactured at the Yonkers Machine Works, Westchester co., N. Y. Office in New York City, 229 Broadway, Room 25 1-2. WM. MONTGOMERY & CO. 38 3*eow

PORTABLE STEAM ENGINES.—S. C. HILLS No. 12 Platt st., N. Y., offers for sale these Engines, with Boilers, Pumps, Heaters, etc., all complete, and very compact, from 2 to 10 horse power, suitable for printers, carpenters, farmers, planters, &c. A 2 1-2 horse can be seen in store, it occupies a space 5 by 3 feet, weigh 1500 lbs., price $240; other sizes in proportion. 28 e3w

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THE COMBINATION PATENT PORTABLE Steam Saw Mill.—This mill is fast coming into use in every section of this country, Canada, Cuba, and South America. It has received the endorsement of several thousand experienced lumber manufacturers, and is pronounced by all who have examined its operation, to be the most simple, efficient, and practical machine for the purpose ever produced. Of the large number of these mills now in operation we defy any person to point to a single one of them that has failed to give perfect satisfaction. The entire cost of the mill, with a first rate steam engine and boiler of about 15 horse power, the whole establishment complete and in perfect running order, delivered ready for shipment in this city, is $1,650. Portable Engines, Grist Mills, Shingle Machines, &c. Send for pamphlet. J. M. EMERSON & CO., No. 1 Spruce st., New York, BRAGG, BURROWS & CO., St. Louis, Mo. 38 tf

DR. D. BREED, late Assistant and acting Chief Examiner in the U. S. Patent Office, has established at Washington, D. C., a chemical laboratory for experiment and analysis, in order to test and improve processes of manufacture, and mechanical devices employed in the chemical arts, and to procure and defend patent rights. After many years devoted to chemistry (having studied in the German laboratories) Dr. Breed feels confident in offering his services as a practical chemist to inventors and others interested in the chemical arts and manufactures. 38 5*

PUMPS—BURNAP'S Patent Excelsior Pumps are acknowledged to be the best and most durable force pump in use, and are fast taking the place of all others for steamers, factories, breweries, &c. See engraving in No. 34, this Vol. Scientific American. Address BURNAP & BRISTOL, Albany, N. Y. 34 13*

WOODWORTH'S PATENT PLANING MAchines of every kind and all prices. A large assortment on hand; and I am prepared to construct any machine to order from ten days to two weeks, and guarantee each machine to be perfect in its construction, and give purchasers entire satisfaction. The patent has expired, and will not be renewed. I make this business exclusive, manufacturing nothing but the Woodworth Machines, and for that reason can make a better article for less money; and with my fifteen years' experience I fully guarantee each machine to come up to what I am willing to recommend, that is, that each machine shall be more than equal to any other manufactured for the same price. JOHN H. LESTER, 57 Pearl st., Brooklyn, N. Y., three blocks above Fulton Ferry. 35 tf

STEAM PUMPS, Boiler Feed Pumps, Stop Valves, Oil Cups, Cocks, Steam and Water Gauges, sold by JAMES O. MORSE & CO., No. 79 John street, New York. 28 13

BRECKENRIDGE COAL OILS—The Breckenridge Co. are now prepared to supply these oils for lubricating and burning purposes, in quantities to suit. Attention of consumers is requested. F. F. THOMPSON, Agent, 98 Greenwich st., N. Y. 35 6*

BOILER FLUES—All sizes, and any length desired, promptly furnished, by JAMES O. MORSE & CO., No. 79 John street, New York. 28 13

WROUGHT IRON PIPE—Plain and galvanized sold at wholesale, by JAMES O. MORSE & CO., No. 79 John street, New York. 28 13

ENGRAVING ON WOOD and MECHANICAL DRAWING, by RICHARD TEN EYCK, Jr., 128 Fulton street, N. Y., Engraver to the Scientific American. 16tf

TO INVENTORS AND MANUFACTURERS—Rooms with power, for the exhibition of machinery, can be had in the Depot Buildings, corner of Elm and Franklin sts. The location is extremely desirable for its prominence and convenience to the business part of the city. Apply to T. BENNETT, on the premises. 34 tf

GEORGE S. LINCOLN & CO., Hartford, Conn., Manufacturers of Machinists' Tools. An assortment of new and second hand machinery constantly on hand. 30 tf

MACHINE BELTING, Steam Packing, Engine Hose.—The superiority of these articles manufactured of vulcanized rubber is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise, at our warehouse. NEW YORK BELTING AND PACKING COMPANY. John H. Cheever, Treasurer, No. 6 Dey street, N. Y. 40 tf

SOMETHING USEFUL for Machinists and operatives of Machinery—Simmons' Decimal Chart, for finding the size of wheels and pulleys for any required number of revolutions per minute—a great saving of time and lengthy calculations. Sent free for $1. D. G. SIMMONS, 255 West 27th st., New York. 38 4*

BOILER INCRUSTATIONS PREVENTED—A simple and cheap condenser manufactured by Wm. Burdon, 102 Front st., Brooklyn, will take every particles of lime or salt out of the water, rendering it as pure as Croton, before entering the boiler. Persons in want of such machines will please state what the bore and stroke of the engines are, and what kind of water is to be used. 27 tf

FORBES & BOND, Artists, 89 Nassau st., N. Y., Mechanical and general Draughtsmen on wood, stone, &c.

LAP-WELDED IRON BOILER TUBES.—Prosser's Patent.—Every article necessary to drill the tube-plates, and set the tubes in the best manner. 18tf THOS. PROSSER & SON, 28 Platt st., N. Y.

50 STEAM ENGINES—From 3 to 40-horse power also portable engines and boilers; they are first class engines, and will be sold cheap for cash. WM BURDON, 102 Front st., Brooklyn. 27 tf

GOLD QUARTZ MILLS of the most improved construction; will crush more quartz and do it finer than any machine now in use, and costs much less. WM BURDON, 102 Front st., Brooklyn. 27 tf

OIL! OIL! OIL!—For railroads, steamers, and for machinery and burning—Pease's Improved Machinery and Burning Oil will save fifty per cent., and will not gum. This oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The Scientific American, after several tests, pronounced it "superior to any other they have ever used for machinery." For sale only by the inventor and manufacturer. F. S. PEASE, 61 Main st., Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the United States and Europe. 40 tf

NEW HAVEN MFG. CO.—Machinists' Tools, Iron Planers, Engine and Hand Lathes, Drills, Bolt Cutters, Gear Cutters, Chucks &c., on hand and finishing. These Tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address, "New Haven Manufacturing Co., New Haven, Conn. 40 tf

HARRISON'S 30 INCH GRAIN MILLS—Latest Patent.—A supply constantly on hand. Price $200. Address New Haven Manufacturing Co., New Haven, Conn. 40 tf

WOODWORTH'S PATENT PLANING MAchines—Patent expires Dec. 27th, 1856. Machines constantly on hand, together with steam engines and boilers of all sizes. Lathes, planers, drills, circular saw mills, belting of leather and rubber of the best quality. Orders respectfully solicited at the Machinery Depot, 163 Greenwich st., N. Y. A. L. ACKERMAN. 36 8

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Science and Art.

Galvanic Gas Igniter.

To turn the stop cocks successively of a large number of gas burners, and apply a match or torch to ignite the jet, is a work which requires considerable time. In some situations, as in public halls and the like, the act of igniting the gas in this manner so far distracts the attention of an audience that it is impracticable to light the house while a meeting is in session, and it has consequently been considered necessary either to light the gas a long time before hand in the broad sunlight, or to adjourn at dusk. In many places, such as among the scenery of theatres, a large share of the risk of fire is due to the lighting of the gas with torches.

The object of the invention here illustrated is to provide means of not only igniting, but of turning on or shutting off the gas, by the galvanic current. The igniting is performed by the direct or rather by the calorific effect of a current, and the turning of the cock by the electro-magnetic action of a current from the same or a different battery conveyed through another set of wires.

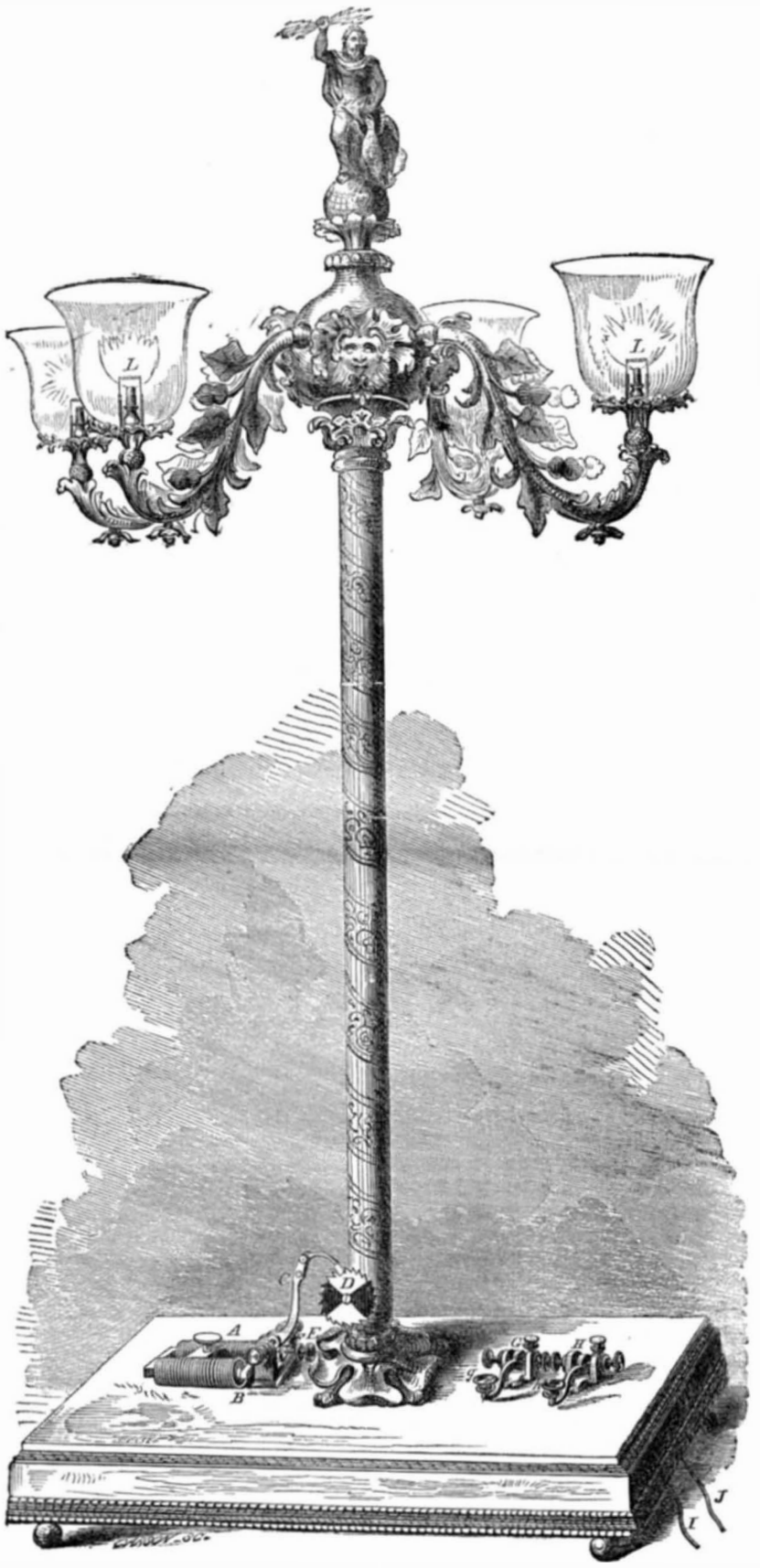
When a powerful current is carried through a wire which is, either from its small size or the nature of the metal, not a very good conductor, such wire becomes very much heated. The amount of heat developed in passing any obstacle depends on the "quantity" of the current or on the *size* of the cups or plates employed, but the ability of the current to pass through a long wire under such circumstances, or through a considerable number of such, depends on the "intensity" of the current, or the *number* of pairs or cups employed. The temperature required to ignite gas is generally at or below a red heat, and to light a jet by this means it is simply necessary to locate a small wire, or better, a small coil of the same in the stream of issuing gas and connect the wires. In order that the wires may endure the continued heat it is necessary that they be of precious metal, and in practice platina is adopted on account of its ability to withstand a very intense heat and consequently a very powerful current without fusion.

In the engraving, L represents the coil of platina wire (No. 10 diamond gage=No. 30 ordinary steel gage) soldered to the ends of the stouter copper wires represented on each side of the burner. The wires lead down to the keys, H *h*, which may be many rods or even miles distant if necessary, and by depressing or releasing *h*, the circuit is made or broken at will.

A represents two helices, within which are soft iron bars which become electro-magnets, while the current is flowing through the helices. B represents an armature, or keeper, also of soft iron, mounted on the short arm of the lever C, the whole being arranged and connected to the keys, G *g*, in the same manner as in telegraph operations, so that whenever the key, *g*, is depressed, the circuit is completed, the iron becomes magnetic and attracts the keeper, giving motion to the lever, C; and as often as the key, *g*, is released, the circuit is broken, the magnetism is lost, and the parts resume their original positions by the action of a gentle spring. The analogy only fails at the end of the lever, C, where, instead of a pencil or marking point, is mounted the pawl represented, which at each vibration of the lever, or each movement of the key, turns the ratchet wheel, D, one notch. D is fixed on the plug of an ordinary cock, which controls the flow of gas to the burners, and by working the key, G, the cock may thus be slowly turned continuously around in one direction, giving alternately periods of light and darkness. To aid the operator in manipulating the single but very tastily designed group of burners represented in the engraving, the ratchet wheel, D, is made in alternate dark and white sections, as represented. When the pawl works on the white, the cock is open and gas is flowing, but by depressing *g* twice, it shuts. By depressing it four times more, it begins again to flow, so that by properly manipulating the key, *g*, the gas may be shut off or let on at pleasure. I and J represent the wires connecting the keys with the battery beneath.

The inventor of this ingenious apparatus is Mr. Samuel Gardiner, Jr., of this city. Application for Letters Patent of the United States is now pending, and British and French patents have already been obtained through this office. It has been, as noticed last week, successfully introduced in the Broadway theater, in this city, and arrangements are being made for introducing it in one of the principal theatres in Philadelphia. The apparatus, as applied in these situations, is only employed to ignite the gas, the letting on and shutting off the same being done by hand in the ordinary manner by cocks in the prompter's box. The current is applied to one chandelier at a time, coils on the burners of which become instantly heated, and the gas jets follow each other rapidly in igniting, after which the current is turned upon another group of burners. It requires but about thirty seconds to light all the chandeliers in the whole house by this means, an operation which, as ordinarily conducted, occupies two men an hour. As a means of showing its power, it is customary to shut off and again ignite the gas between each act. The battery employed is Smee's, thirty cups being employed, each of one gallon capacity.

GARDINER'S GALVANIC GAS IGNITER.



As indicative of the increased safety of this apparatus, we learn that one of the insurance companies has offered to insure theatres for 25 per cent less premium where this apparatus is employed. In all large buildings, the gas saved by being able to light in so short a time when desired, is certainly a very important item. Another point worthy of notice is, that the coil, being always kept heated by the flame, retains heat enough for several seconds without aid from the battery, to ignite a jet when it chances to be extinguished by any sudden puff of wind, a very important consideration in street lighting. There are reasons to suppose from the experiments of the inventor, that it is perfectly practicable to light by this process all the burners in a mile of street.

For further information, inquiries may be addressed to Mr. Samuel Gardiner Jr., 167 Broadway, New York.

The Comet.

The predicted comet of D'Arrest is now visible in the northwestern part of the heavens, near Ursa Major. The assertion of a French astronomer that this comet would strike the earth, seems to have met with general skepticism. "It is useless to speculate," says Professor Mitchell, "in reference to the possible consequences of a collision with a comet, as there is scarcely one chance in millions that it can occur. Science has yet discovered no guarantee for a planet against the possible shock of a comet, but an examination of the delicate adjustments of our own system and those of Saturn and Jupiter, would seem to indicate that in all past time no derangement has ever occurred from such a cause."

It was only last week that the Erie Canal was in a fit state for the navigation of the present season. This has been the latest and coldest spring within the recollection of the oldest inhabitant.

Insurance of ships was first practised in the reign of Cæsar, in A.D. 45. It was a general custom in Europe in 1194. Insurance offices were first established in London in 1667.

Literary Notices.

THE MAGIC STAFF: AUTOBIOGRAPHY OF ANDREW JACKSON DAVIS—A. J. Davis, "the seer," as he is called, has now given to the world his own history, which is written in a style very interesting to many persons; it does not possess that nervous force, however, which we like, but is very diffuse. It is not a simple, clear narrative, but written in that style of philosophy so common with those called "spiritualists." There is one thing we admire in this volume, however, that is, the kind and amiable spirit which permeates through the whole of it. Published by J. S. Brown & Co., Frankfort st., this city.

ILLINOIS AS IT IS—This is the title of a most useful and interesting volume by Fred. Gerhard, of this city. It contains a brief sketch of the early colonies, and a very full history of the "Prairie State," as it is called. The natural resources, products, geological characteristics, the progress in agriculture, in short, everything relating to Illinois appears to be described in this work. It contains a map of the prairies, woods, and bluffs in the State; also a geological map, which shows that it possesses the most extraordinary deposits of lead and coal in the world—in fact, three-fourths of the entire State is a coal field. For sale by Fowler & Wells, 308 Broadway, this city.

IMPERIAL ENCYCLOPEDIA OF MACHINERY—Parts 7 and 8 of this great work, published by Russell & Bros., Tremont st., Boston, are now ready. They contain drawings of an improved Jacquard loom, a new disk engine, erected at the *Times* office, London, and a short stroke reciprocating engine, for screw propulsion. This is an admirable and comprehensive work on machinery.

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